

SUPPLEMENT.

The Mining Journal, RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

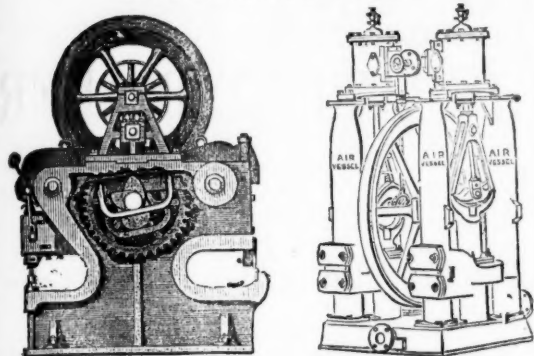
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No. 2049.—VOL. XLIV.

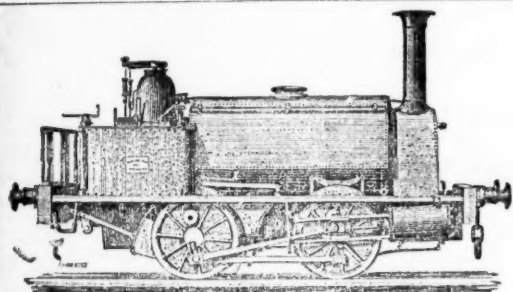
LONDON, SATURDAY, NOVEMBER 28, 1874.

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SALFORD, MANCHESTER.**



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TION," in Dublin, 1865; at the "UNIVERSAL EXPOSITION," in Paris, 1867;
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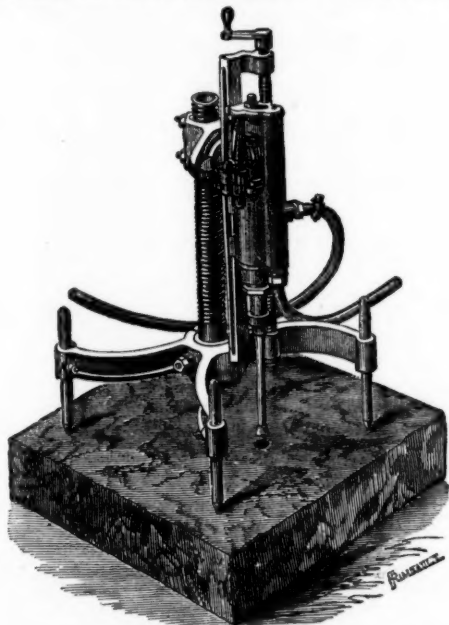
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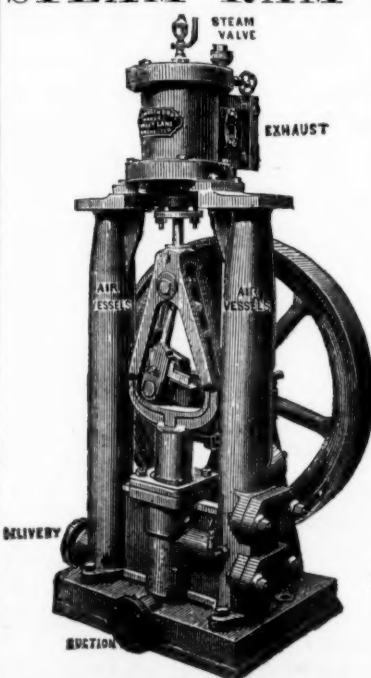
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For Neatness,
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Useful to Mill-owners,
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The SIMPLEST, CHEAPEST, and BEST Machine in the World for
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Is extensively used at the principal Mines, Collieries, and Quarries of Great Britain, and the Continent of Europe.

"To this invention, which appears to possess several advantages over the machines previously exhibited at Falmouth, the Judges are unanimous in awarding a first-class silver medal" (the highest award).—*Report of the Judges at the Royal Cornwall Polytechnic Society's Exhibition, 1873.*

"The boring machine works splendidly."—W. TORRANCE: *Mid-Calder.*
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"Under the most difficult circumstances, they give every satisfaction."—G. GREY: *Montreal Iron Mines, Cumberland.*

"The simplest and best boring machine."—Capt. WASLEY's letter to the *Mining Journal*, Oct. 18, 1873.

"It gives every satisfaction."—W. E. WALKER: *Lord Leconfield's Iron Mines.*

"The rock-drill I bought of you seven months ago has given me entire satisfaction, and I am convinced that the 'Kainotomon' is the best rock-drill in the market."—P. MCGINNIS: *Strabane.*

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The advantages over other Rock-boring Machines claimed for the "Kainotomon" are—

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- 4.—It may be fed 3 inches out of stroke, without stopping the working of the drill, an invaluable advantage.
- 5.—It is not liable to derangement.
- 6.—It has not one-third the number of parts in its construction.
- 7.—All stuffing-boxes and parts requiring adjustment are dispensed with.
- 8.—It is so simple in its construction that any ordinary labourer or miner can drive it, simply having to turn on the motive power and feed the drill.
- 9.—The rotation is compulsory, and regular.
- 10.—40 lbs. pressure only is required to work it.
- 11.—A saving of over 50 per cent. in iron and flexible piping.

"THE CONOMIC" COAL-CUTTERS, AIR COMPRESSORS, BOILERS, &c.

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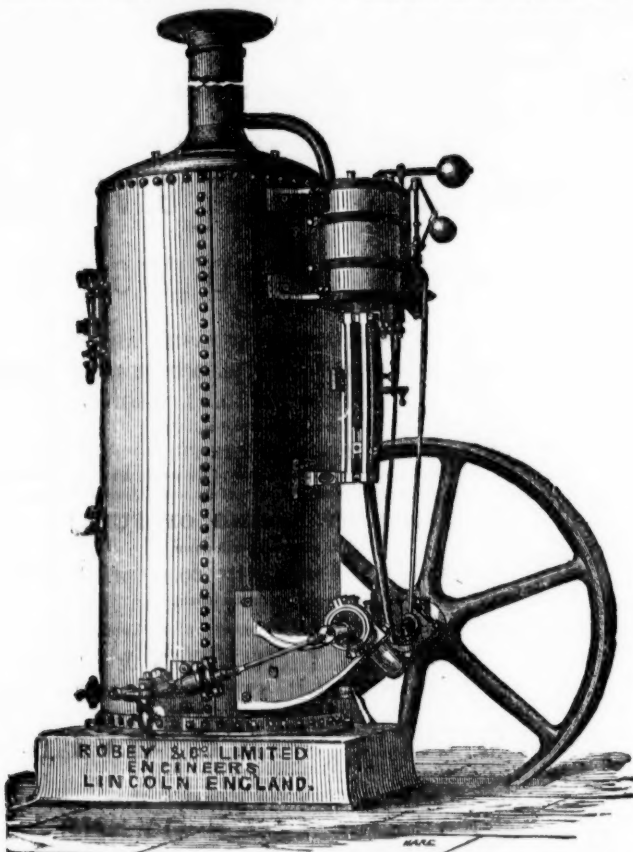
Patent No. 4136

Dated 16th December, 1873.

Patent No. 4150

Dated 17th December, 1873.

IMPROVED VERTICAL STEAM ENGINES AND PATENT BOILERS COMBINED.



The Illustrations show one of Robey and Co.'s improved vertical engines.

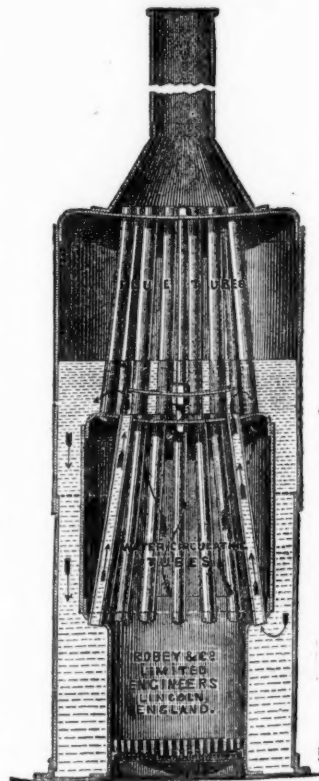
All these engines are supplied with Robey and Co.'s new patent vertical boiler, as per section illustrated, which has, among others, the following advantages over all vertical boilers yet produced:—

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SEPARATION OF THE SEDIMENT.

GREAT DURABILITY.

GREAT ECONOMY IN FUEL.



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THIS OIL is suitable to every kind of Machinery; it is used almost exclusively in Her Majesty's Dockyards and Fleet, and by the War Office and East India Government; as well as by the Royal Mail Steam Packet Co., Pacific Steam Navigation Co., P. and O. Co., Cunard Co., and by most of the other important Royal Mail Steam Fleets in the kingdom. It is also extensively employed on the various railways, and by many of the leading engineering and manufacturing firms at home and abroad. "Chemical Laboratory, 7, Printing House-square, Blackfriars, April, 1869."

"I hereby certify that the Rangoon Engine Oil, manufactured by Messrs. Chas. Price and Co., is free from any material which can produce corrosion of the metal work of machinery. It is calculated, indeed, to protect metallic surfaces from oxidation, and, from its peculiar character, is not liable to lead to spontaneous combustion of cotton waste or any similar material which might become imbued with it, as is the case with Rape, Gallipoli, and Olive Oils. The lubricating power of this oil is equal to Spermin or Lard Oil."

T. W. KEATES, F.C.S., &c., &c., Consulting Chemist to the Board of Works.

Extract from Mr. BAXTER's Speech in the House of Commons, May 31st, 1870:—

Chas. Price and Co.'s Rangoon Oil—"a vastly superior article" (speaking of Gallipoli Oil at £73 per ton)—"was obtained for from £40 to £45 per ton."

Every parcel of the Oil sent from the Works bears the Trade Mark of the Firm, and as many spurious imitations of the Rangoon Engine Oil are sold purchasers are requested to observe that none is genuine which does not bear this mark.

Oil, Tallow, and Colour Merchants, Seed Crushers, Turpentine Distillers, &c.

London: CASTLE BAYNARD, UPPER THAMES STREET, & MILLWALL, POPLAR.—Works: BRITH, KENT.

THOMAS WARDEN & SON,
IRON, STEEL, AND GENERAL MERCHANTS,
LIONEL STREET, BIRMINGHAM,
Manufacturers of Anvils, Vices, Hammers, Bellows, Tug Irons, Hydraulic and Screw Jacks, Crabs, Cranes, Spades, Shovels, Picks, Arms and Boxes, Axles, Springs, Hurdles and Fencing, Screw Bolts, Washers, Hames, Chains, Files, Nails, &c., &c.

SECOND-HAND RAILS, AND EVERY DESCRIPTION OF RAILWAY, COLLIERY, AND CONTRACTORS PLANT ALWAYS ON HAND.

Original Correspondence.

CONFERENCE OF THE NATIONAL MINERS' ASSOCIATION.

The half-yearly Conference of the above Association, which numbers upwards of 138,000 members, was brought to a close on Saturday last at Barnsley, and was undoubtedly the most interesting and eventful gathering which has yet taken place. Not only were the subjects discussed of great importance, but the close of the meeting was rendered memorable by the announcement that a few miles from the Assembly Hall an explosion had taken place, by which 23 persons were killed and several seriously injured. The Conference took place in a truly palatial building, replete with every comfort and convenience, and in those respects could not be excelled by the most recently erected of our Government offices in Whitehall or the West End clubs, whilst it had the great advantage of being the property of working miners alone. The council hall, where the delegates met, is a well-proportioned and lofty room, in which are a considerable number of good paintings, whilst the luxuriant and well-stuffed seats, with backs to match, were most enjoyable to the men, many of whom, as Mr. NORMANSELL put it, were more used to sit on a lump of coal than a soft and padded cushion. The representatives of the various mining bodies included the ablest leaders connected with the collieries in the kingdom—men that were able to debate with considerable ability some of the most important questions bearing on the relationship of capital to labour. As usual Mr. MACDONALD, M.P., as President, was dignified as became a gentleman of position, and who is also one of Her Majesty's faithful Commons. He conducted the duties of his office with magnanimity, and at times even with condescension. Mr. BURT, the Member for Morpeth, plain, but thoroughly practical, without any attempt at ostentation or display, was always ready with some happy and well-timed suggestion to meet an emergency when it occurred, so that the more one sees of him—apart from his political leanings—the more one is impressed with his really good and estimable qualities. Mr. CRAWFORD, of Durham, whose sound, common sense and grasp of mind is a credit to those who hail him as their chief, done good service in pointing out what was to the advantage of the body he was connected with, as did also Mr. W. BROWN, of Staffordshire, a well-known Yorkshire worthy; Mr. DIXON, and Mr. PICKARD, of West Yorkshire; Mr. SHEPHERD, of Cleveland. The Vice-President, Mr. J. NORMANSELL, who has made South Yorkshire the model mining district in the kingdom, was most effective in clearing the road from difficulties, which frequently cropped up.

Very little was done the first day, the business commencing with a welcome from the President to the magnificent hall belonging to the South Yorkshire Miners' Association, the members of which he also congratulated on the fact that they had recently purchased a colliery. On the second day, Mr. MACDONALD gave the usual address, in which he expressed the pleasure he felt at being able to state that there were no large bodies of miners or other workmen out on strike in any part of the kingdom, characterising that state of things with the position of the miners and others in some parts of America, where the president of a colliers' association recently said that a blight had fallen upon the industries of that country, and none heavier than upon the coal and iron departments. Mr. MACDONALD then at considerable length entered upon the question of foreign competition, and whilst avowing that he was not one of those who believed that England was losing its commercial supremacy, still admitted that we were importing iron into this country from Belgium, and the reason for this was said to be the greater skill, the better arrangement, and the better aptitude of the continental workmen. Mr. MACDONALD, as on a previous occasion, did not adduce any figures to maintain his own position that the trade has not been driven out of the country owing to the high prices charged, and in which the workmen's wages played a by no means unimportant part. That we are losing our prestige to some little extent at least, we might point out to the miners that our exports of coal and iron during the present year were considerably less than for the corresponding period of 1872. This, in our opinion, is the reverse of satisfactory, and might, naturally enough, have been worth considering and dilating upon by the President, whose position as a member of the Legislature might have enabled him to point out the cause and suggest a remedy. Believing, however, that there might be something in the statement so frequently reiterated as to the superiority of the foreign workmen, he suggested that some of the delegates should be empowered to visit France and Belgium, and see the miners and ironworkers in their own homes, judge for themselves, and give the results of their investigations in the shape of a report to the next Conference. This, we think, will be carried out, and to the advantage of the English workmen, who, in very many instances, depend more upon their personal strength than their knowledge, cultivating the corporeal at the expense of the mental. Supply and demand was another topic which the President dwelt upon at considerable length, his argument being that the men had a right to limit the supply of an article so as to maintain its price at a certain standard. He illustrated his position by referring to the proprietors of the daily papers, who limited the price because they could not sell for less, and who printed no more copies than they knew they could sell. The comparing of newspapers to coal does not appear a very happy one, for one is essential to life, the same as bread, while the other is more of a luxury—and one that is not so often indulged in by the working man—and can easily be dispensed with. Few will grumble when the supply of an article is kept fully up to the demand, but what most thinking people will not agree with is the forcing up of prices by limiting the production of any article below the actual requirements. This it is that has sent a good deal of our trade abroad, and will send a great deal more if the policy of high wages at any and every cost is to be persisted in by our workmen. Iron and coal abound throughout the greater part of Europe, and the last two years have seen more rapid strides made in the development of the mineral resources of all continental countries than for a dozen years previously. This is no unimportant matter if we only look to the fact that about one-ninth of all the coal raised in the kingdom is sent abroad. A good deal was said about the elevation of the working man, which is to be effected by co-operative establishments, so that the wealth of the country is to be more generally distributed than at present. This has long been the staple remedy, by which the poor are to become rich, and the rich poor, but as nothing can be done without money we think that capitalists need not be afraid of meeting co-operators in any of the markets, for whilst the profits made in a large concern may be a good income for one or two persons, yet they would be but trifling if divided into two or three thousand shares. There are some collieries now being worked on the co-operative principle, and they have not turned out particularly successful. The President concluded a lengthy address by a feeling allusion to the late Mr. ALLEN, the secretary of the Amalgamated Engineers, who was admittedly one of the best organisers of unionism in the country.

The very important question of the storage of gunpowder in mines was introduced by Mr. NORMANSELL, and led to a lengthy and interesting discussion. The only mention of gunpowder in the Act of 1872 is in the 8th general rule, and that is very indefinite. In the first place, it states "it shall not be stored in the mine." Many of the delegates contended that leaving a pound of powder in the pit could not be termed a "storing" of it, whilst Mr. NORMANSELL stated that a man belonging to the Association had been fined for having 1 lb. of powder in his canister after his day's work was over, and leaving it at the bottom. If powder is not to be stored in the mine where it is to be put, for no provision is there in the Act as to where it is to be placed when brought to the bank? If a man has to take it home, then his house and family are in danger. It was stated in connection with ironstone mines in some places in the Cleveland district as much as 1½ ton of powder was used in the course of 24 hours, and at the time of the Mines Act coming into operation nearly every house in Cleveland was a powder magazine. As many as six quarter barrels were stored in one house, three of them being placed under the bed, with the head of each knocked out. Ultimately it was agreed that the mineowners should be urged

to provide storage places for powder on the surface, seeing that it was highly dangerous for the men to take it to their houses.

The working of the Mines Regulation Act in various districts was discussed, and it is gratifying to find that in most instances the Government Inspectors were said to have done their duty well. It was, however, stated that in one or two districts there was some little laxity, whilst in some others the masters had shown a disposition to evade the weighing clause. On the whole, however, the Act since it came into operation had worked satisfactorily—such was the opinion of the delegates.

A proposition was made to omit several rules which gave power to the Association to make levies for the maintenance of men on strike, or who might be locked out. Mr. CRAWFORD, of Durham, contended that local associations would prefer giving pecuniary grants in support of men on strike, whilst they did not like the system of levying, and which was never very cordially submitted to. A long discussion ensued, during which more than one resolution was proposed. At last something like a compromise took place, for it was agreed to appoint a committee to take the rules into consideration, with a view to the strengthening the various districts represented at the Conference.

The question of supply and demand was introduced in a lengthy speech by Mr. LLOYD JONES, of London, who contended that the men could keep the supply of coal at the bottom instead of bringing it to the surface. But the question really appears to us to be not the keeping of the coal undisturbed, but whether a workman engaged to do certain things is not obliged to carry out his bargain, and do a day's work in a day. If the masters and men combine to keep down production, no doubt they have a right to do so—although the right is a very selfish one—but that they could not do for very long, as we all very well know, for there are certain natural laws that neither masters nor yet workmen can successfully oppose. Another matter in connection with supply and demand was also considered—that was the number of labourers and others who were being employed in collieries and becoming miners. This, of course, had the effect of giving an excess of hands, and consequently tending to the lowering of wages. Mr. BURT, M.P., moved a resolution to the effect that as the influx of labour in mines was on the increase, and the supply at present in excess of the demand, that the Amalgamated Association be invited to hold a joint council to consider the expediency of devising means to restrict the present excess. This was agreed to, but the carrying of it out will be no easy task, for colliery owners are not likely to consult their workpeople as to whom they shall or shall not employ.

With respect to foreign competition, which many do not believe is so great as it really is, a discussion took place, when several suggestions were made. It was at last agreed that a committee should be appointed to enquire into the competition of foreign workmen, and the reason of the alleged success of foreign countries with our own.

One of the last acts of the Conference was to appoint a committee to visit the Warren Vale Colliery, where an accident has taken place by which 23 lives were lost, to enquire into the cause of the catastrophe. The proceedings during the five days the meeting lasted were characterised by a harmony of action and a desire to elevate the miner in every possible way, as well as to ensure him increased safety whilst at work. Although as far as actual work is concerned but little was done, yet there was an amount of suggestive matter thrown out that may ultimately be advantageous to the mining body, and will at least provide pabulum for serious consideration until the next Conference, which is to take place at Saltburn-by-the-Sea, close to which are several large ironstone mines.

BOARD OF EXAMINATIONS FOR MINING CERTIFICATES FOR SOUTH STAFFORDSHIRE AND WORCESTERSHIRE.

SIR,—In your impression of the 21st inst. a letter appeared, under the above heading, from Mr. Wm. Blakemore, from which it might be inferred that the meeting for the examination by Mr. Baker alone was convened by me, as Chairman, or that I was a party in some way to its being held.

The fact is, that on the occasion Mr. Blakemore mentions I most emphatically declined to have anything to do with such proposed meeting, unless the other two examiners had such notice of it as would give them an opportunity of being present.

As Mr. Blakemore says in the onset of his letter that he desires "to lay a simple statement of facts before the public," I think he should have been careful that no part of such statement could be susceptible of any misinterpretation. E. FISHER SMITH.

The Priory Offices, Dudley, Nov. 25.

WHAT IS ELECTRICITY?

HOW TO PRODUCE ICE WITHOUT USING WATER TO BEGIN WITH.

SIR,—What is water? In all the chemical works it is stated that water consists of a chemical combination of the two gases, oxygen and hydrogen. It is not so, it is a mistaken notion, for water does not consist of the above-named gases. Water consists of a chemical combination of the two solid materials, solid oxygen and solid hydrogen, and the following experiments will prove my theory to be correct.

How to produce oxygen.—Take some oxide of manganese and place it in a retort, and apply heat to the retort, and oxygen gas will be produced, for the material heat or electricity in a certain form will enter into a chemical combination with the solid oxygen of the solid oxide of manganese, and produce oxygen gas—a permanent gas; and the above gas is a compound, and not a simple body, as it is stated to be in chemical works, and for every cubic foot of oxygen gas produced the oxide of manganese will lose 1 oz. of its solid oxygen.

How to produce hydrogen.—Take some good house coal and place it in a retort, apply heat to the retort and carburetted hydrogen gas will be produced, for the material heat or electricity in a certain form will enter into chemical combination with the solid hydrogen of the coal and some of the solid carbon of the coal, and produce the carburetted hydrogen gas named above.

If the above gases, oxygen and hydrogen, pass through a chemical process called combustion they will both be decomposed at the same time, and the same heat will be liberated that was lost (combined) in producing the two gases named. At the same instant of time, and at a great heat, we liberate the two solid materials, oxygen and hydrogen (not gases), and they at once combine chemically and form water, and the liberated heat goes off by radiation. The carbon of the carburetted hydrogen gas combines with oxygen gas and produces carbonic acid gas, consisting of two solid materials, and the material heat chemically combined with the solid carbon from the coal, the solid oxygen from the solid oxide of manganese, and heat or electricity in a certain form.

Suppose we produce 9 ozs. of water by the above process, 8 ozs. of it consists of solid oxygen, it came from the solid oxide of manganese; and 1 oz. came out of the coal, and consists of solid hydrogen, it was a solid material in the coal. If the temperature of the atmosphere is below freezing point we shall have 9 ozs. of ice, a solid material produced from the two solid materials, oxide of manganese and coal. The above piece of ice was produced from the two solid materials mentioned, and that by the use of the material heat or electricity in a certain form. Without the above heat we could not do it, for if we retain the heat the gases will remain as permanent gases forever, the same as the oxygen gas in our atmosphere. It remains as a permanent gas, be it ever so hot, or ever so cold, as it is called. We cannot produce the water or ice without we get rid of the heat, and that we cannot do without we decompose the gases mentioned. The heat acts as a carrier of the solid materials required to produce the water or ice. The heat in the first place, by a chemical process, enters into combination with the solid materials and produce the gases; in the second place, by another chemical process, called combustion, the above gases are decomposed or broken up, the heat going one way and the solid materials another; and by a third chemical process the solid oxygen and the solid hydrogen combine, and produce water or ice if required. I think the above explanation will prove to any unbiased man

that my theory of the compound called water is correct, and that the old gas theory is not the correct one.

With regard to the letter of Mr. Edward Skewis, in the Journal of Nov. 21, with respect to the gases he mentions, he is quite correct as to the volume of gases required. It takes two volumes of hydrogen gas and one volume of oxygen gas to contain the solid materials in the solid proportions to produce water without leaving a residue, but decomposition of the gases must go on, and the heat must be liberated from the solid oxygen and solid hydrogen before you can produce water.

With respect to the lecture Mr. Skewis named, all stated in it is quite correct according to the most modern chemical works. It gives a description of steam, also how to produce water, and how to decompose water, &c. With respect to steam, it is described the same as it was by James Watt and Dr. Black; and with respect to water, the compound is the same as it was left by Cavendish. James Watt and Dr. Black made mistakes when they tried experiments on steam, on two points at least; and Cavendish made a mistake on one point with respect to the composition of water, for it consists of two solids, and not two gases, as he stated.

If agreeable, I will at some future time send a paper headed, What is Steam? I believe I can clear up the mistakes made by James Watt and Dr. Black, and also show the reason for the great economy of the Cornish engines, when I point out the mistakes made by James Watt and Dr. Black. I, of course, shall explain it so that it can be proved by experience, and so that other people can try the experiments over again, and satisfy themselves.

I have stated that oxygen gas and hydrogen gas are both chemical compounds, and I am quite sure that all the other gases are compounds also. I believe there are a great many materials now considered simple bodies that are compounds. In trying some experiments on iron many years ago, I was trying to produce good steel from common English iron. I found my experiments would cost me more money and time than I could spare, but I went far enough for me to believe iron to be a compound, and to consist of carbon, hydrogen, and some other material, I know not what, combined in some peculiar manner, and from experiments I have tried I believe that phosphorus, chlorine, and several other materials are not simple bodies, but compounds.

With respect to the diamond, that is a simple body, there is no mistake about that. I believe chemists will be able to produce diamonds from charcoal when they get a little more knowledge in that direction. I carried some experiments a long way to try to produce diamonds from charcoal with every prospect of success, but my apparatus failed, and the process for the indications proved good as far as they went, but my electric power was not strong enough, and that stopped me, and since that time I have never had the money or time to advance further in the diamond experiments; to me they became a source of great pleasure, for there was the pleasure of trying the experiments as well as a bright prospect in view. If I had the money, and nothing else to do, it would be my delight to begin the diamond experiments again at the point I left off, and to carry them as far as the power of electricity would take them. I think it is possible by means of electricity, properly applied, to produce a great degree of heat—something like 30,000° or more—by a certain process, for the limits of heat are not known when produced by free heat, or electricity. I have produced a great degree of heat by means of electricity, but I have not gone so far as I should like to go for the want of money necessary to carry out the experiments. Chemists, with all the appliances at hand, can try the experiments required in producing water from solids, taking particular care and notice of the heat combined with the solid oxygen and hydrogen, and the heat liberated when water is produced.

Mawbey-road, Old Kent-road. RICHARD JEX CRICKMER.

WHAT IS ELECTRICITY?

SIR,—I for one should like to hear a little more from Mr. Crickmer respecting the results of his experiments in the above, and the theories he has deduced therefrom. Whether it be much or little that he may be able to add to our knowledge, let it be received and judged according to its merits, and let us be charitable in judging of his manner, for the sake of his matter, and from the fact that he is, as he says, a self-taught man. One who has spent 30 years in scientific experiments is surely deserving of a hearing.

Because Prof. Tyndall, following the theory advocated by Rumford and Davy, has given us "Heat considered as a mode of motion," it does not follow that we, although perhaps believing in his theory, should cease to pursue the subject further, for it must be admitted that the definition that "heat is a form of motion of the ultimate particles of matter" is very indefinite for a force so mighty in its action, and although a connection, and even identity, may be asserted by some, we still lack satisfactory and absolute proof that heat, electricity, and magnetism (and some say, light and sound) are but varieties of the same force.

"A Constant Reader" may be reminded of two things—that if prophets do not receive any great honour in their own country it may be to their country's loss; and that if men followed his example in trying to make ridiculous a scientific theory they would but be giving an indirect support to a theory in which they probably do not believe—Darwinism.—Nov. 19. ELECTRON.

WHAT IS ELECTRICITY?

SIR,—I should be very glad if Mr. Crickmer would send you a detailed account of the experiments he has made on water. If he can prove that it does not consist of hydrogen and oxygen he will create a revolution in the scientific world. He will show the world that the teachings of Tyndall, Williamson, Liebig, Roscoe, and Bernays are incorrect, and the whole science of chemistry will have to be remodelled.

There is no need for Mr. Crickmer to call molecules a "fine term." A molecule is only the smallest particle of an element in a free state. It is generally taken to consist of two "atoms," which have a theoretical existence. If Mr. Crickmer cannot understand heat being nothing more or less than a mode of motion I can but point out to him the simplest example of such a theory that I can call to mind. If a poker is left in the fire in an ordinary grate the end which is in the red hot coals becomes heated; and how is this accounted for? The molecules of the iron become violently agitated by the heat generated; this motion is increased until the whole of the iron gets hot. I shall not give up my belief in this theory of heat until Mr. Crickmer can substitute a better one for it. It may be an imaginative one, and I cannot prove it to be correct, but Mr. Crickmer has not yet shown that it is wrong.

I will not offer any more remarks in reference to Mr. Crickmer's statements until you have published details of his 30 years' experiments. They certainly promise to take all our Nature students by storm. A CONSTANT READER.

THE PATENT LAW—SPECIFICATIONS.

SIR,—While thanking you warmly for your very able review of my "Shilling Handbook of Patent Law," in the Journal of Nov. 14, I write to protest against a remark contained in a paragraph in the same number of the Journal. It was as follows:—"It will be readily understood that no amount of searching through mere specifications filed can be regarded as equivalent to even a brief search through the private records of an agent of acknowledged integrity and experience." Now, this idea has been the means of bringing more loss, misery, and litigation on patentees than any other fiction that was ever started. Nearly all patent agents trust to their "private records" (a cant name for memory in such cases), and the result is that three-fourths of all patents taken out at the present time are utterly invalid, owing to the fact of the inventions having been previously secured by former patentees. Probably no firm of patent agents has had to do with 1-50th part of the patents now filed in England; consequently, the chances are 50 to 1 that if there be a patent conflicting with the invention applied for it will have been taken out by some other agent, and not be found, therefore, in the aforesaid "private records" at all. How much better, then, is my plan (recommended in the "Handbook") of searching the original specifications by the aid of the splendid system of indices published by the

Patent Commissioner, supplemented by private indices and abridgements where the official ones are incomplete.

An agent following this plan will be able to tell with certainty whether the invention be new, and exactly to what extent it differs from others that have gone before it. He is then able to make accurate and specific claims, and thus draw up very strong specifications. If, however, the agent has not made an exhaustive search he dare not make specific claims, for fear of their being covered by former patents, in which case they would invalidate the patent, or necessitate disclaimers, he accordingly makes them in a very generalising manner, substantially as described. These latter claims are almost inoperative against infringers in principle, but who deviate slightly in practical details from the invention as described.

WM. P. THOMPSON.

Patent Office, Lord-street, Liverpool, Nov. 25.

MINING IN NEW SOUTH WALES.

SIR.—We are still "suffering a recovery" from our late mining fever, and mere speculation is at a standstill, but a good deal of downright honest mining enterprise is being carried on, and several ventures now begin to look very healthy—notably among them stands the Brown's Creek Gold Mine, which is one of the 50-acre blocks of the very extensive and extraordinary gold-bearing formations (extending in all over a square mile) of which I sent you a detailed account some 18 months since. I enclose you the company's last half-yearly report in case the fuller details might be of interest to any enquirer specially interested, but the result of the first real six months work shortly is—16,000 tons crushed; yield, 2200 ozs.; average per ton, 2 18-24 dwts.; and as the total cost is under 1½ dwt. there is a large margin of profit; also, the mine is only beginning to be opened, and the immense lodes get slightly richer with depth, and as there are only 30 out of the 50 head stampers at work when the whole power is put on, the profit will be much larger in proportion. The whole of the balance of the known continuation of this deposit is freehold land, and, therefore, not subject to gold field rules and interference; and as soon as the various owners can agree amongst themselves it will probably be thrown open for mining, and as there seems (from surface indications) to be work for several batteries, the future yield within the next 10 or 12 years is likely to be something enormous, especially if the theory of our geologists here be true about its being formed by boiling springs, and that it must get richer with depth, which it certainly is doing as yet down to this 120 foot level.

Hawkin's Hill is very quiet; no great finds again as yet, but the rich claims doggedly sinking and driving to try and pick up the rich "shoots" again, of which no practical miner doubts the eventual success; and in the meantime the usual 2-oz. stone is steadily being raised by hundreds of tons, in most cases more than covering the working expenses, and in Paxton-Holman's Mine even giving a third dividend on 140,000 shares, and as they all have a good reserve fund kept back from their profits at the "gold by the hundredweight period," their position and prospects are safe and fair.

Along the whole main line of the run of the reef down the hill towards the Turon river only about five claims are at work—notably amongst them the Queen of the Ranges, on tribute, raising stone looking like 2 ozs. from an 18-in. reef, whilst a rumour has just come in that an adjoining claim at 160 ft. deep struck a patch of the real hill stone (i.e., more gold than quartz); if it be true (?) it will give a great impetus to the scores of idle claims, as it will help to disprove the theory that the very rich shoots were only to be got up on the hill itself. Higher up, above Krohman's, Paxton's, Star of Peace—the remaining three or four supposed rich claims are being let on tribute—and the Frenchman have got stone looking like 16 ozs. at the 230 foot level. No work is being carried on beyond these few, as Holman's freehold land blocks the line, and he, like a wise man, as he is not bound by labour conditions like all the rest (Government lessors), waits quietly till all his neighbours absolutely prove the exact depth and direction of the rich veins up to his fence before he sinks his shaft at 6½ per foot.

The English Company begin to crush this week at their Sir John Moore claim, Chamber's Creek. If the stone at present raised (several hundred tons) only gives 4 oz., it will pay well, and as they are on the real main Hawkin's Hill line of reef, there is every chance of their dropping also on to some of the "rich pockets" as they get deeper. Their works have been carried out with great prudence and energy, and from first to last they have set us colonials a lesson, which if we had learnt four years ago would have saved us hundreds of thousands of pounds in mis-directed labour, and possibly have realised us millions by its proper application.

There is a good deal of steady work going on in copper mining, and very few mines have stopped entirely, whilst the opening up of coal mines over the mountains on the railway line enables large lots of poor ores to be profitably smelted. The great bulk of them lie between Bathurst and Wellington, though two of the most likely ones have lately been opened up by the private enterprise of Capt. Armstrong, R.N., who had the luck to get first-class ore in a large lode within one mile of the railway. The *Western Independent* says of it—"The ground is easily worked, and the lode is improving with depth in rich red oxides and grey sulphates, a large quantity of which has averaged over 35 per cent. At 30 ft. the lode is 4 ft. wide, and in consequence of its being bordered with granite country there is every probability of a large deposit or basin being discovered. Rich blue and green carbonates have been traced to the extreme north of this mine, showing that the ore must evidently run right through the ground (100 acres). Plenty of water and two fine seams of fire-clay, enabling furnaces to be cheaply erected, must make this a highly payable property."

From the South Wiseman's the same gentleman has actually raised some 300 tons in the last few months with six men's labour; the first 70 tons of which, just delivered to Lloyd's furnace, averaged 20 per cent., and as the average of the Peak Downs is only 16 per cent., I think he has really got a "good thing," especially as the gossan assays well also for silver and gold; and, besides this, there is another large lode in the ground as yet untouched. I have given these fuller details of these two private ventures (Armstrong's and South Wiseman's), because again it is English pluck and nous, which is showing us how to choose a good mine, and then to profitably work it afterwards.

Tin is being steadily raised, but the great bulk of it is by private adventurers again, who look after their own work, and also after each other, not but what thousands upon thousands of acres of company's ground, now idle, would pay splendidly to work if capital, energy, and a good manager were joined together at it. Profiting by our losses, mistakes, and present utter weariness of mining, a strong English company, with 50,000£. to fall back on, who would send out a first-class reliable manager, ought to make cent. per cent. on their outlay, especially as a railway will be through the heart of the tin mines within three years, and the hitherto excessive carriage thus made reasonable, the difference alone in that item being a profit of at least 7½ per ton on the ore only.

Galena (and also silver ore) has been lately found in 10 to 16 in. veins, running through some 200 acres, not far from a new line of railway in the south; assays go from 40 to 60 per cent. galena, and 10 to 70 ozs. silver. In one place the lode is 4 ft. thick, but nothing has been done beyond sinking three holes, and putting in a short drive; and the finders (poor men) offered the lot for 200£. to a Sydney capitalist, subject to approval, and could not get an offer even, so that will also be idle. There is a rumour of nickel having been found in the same district, and a sample shown me, said to be from there, is certainly very good quality. The Bogolong Iron Mine is also being prospected (the only one in the south yet opened); there are 240 acres of it; lodes from 10 to 30 ft. wide; ores from 50 to 80 per cent.

There is a good deal of excitement about coal; and both on the Southern, Western, and Northern Railways fresh seams are being found and worked, and as soon as the haulage rate is 1d. per mile per ton, the southern and western coal will compete with the Newcastle seaborne coal. The great idea, however, is to bore for coal under Sydney itself, and many circumstances and discoveries up and down the coast lately go to demonstrate that it will be found within 1200 ft.: if so, it will give Sydney such an impetus over Melbourne as must absolutely make her mistress of the Australian ports, for,

however rich the Newcastle deposits are and easily worked, the port itself is not large enough to give dispatch to the yearly increasing fleets that come for cargoes, and as many large ships prefer to load in Sydney Harbour, and have to wait there for steam colliers, and pay 5s. per ton freight between the two ports, in addition to the Newcastle price of 14s., the advantage, both in dispatch, cheapness, and safety of loading when coal is got from under the north shore of Sydney itself will be immense. A practical miner, of 30 years' experience, told me that if a good working seam of 6 ft. is got within 1500 ft. deep he would contract to break out, raise, and ship on board at 6s. 9½ per ton. The scheme was thought visionary 12 months ago, but now it has been well ventilated most objections have been found to be either erroneous or mere assumptions; and, coupled with the fact that several large ships have had to leave Newcastle in ballast because they could not wait for months to get loaded, Sydney merchants begin to believe in it. The originator of it has applied to the Government for the sole lease of all reserves, and all under the whole of the waters of Port Jackson (some hundreds of thousands of acres); and besides that, arranged with the only three large limited proprietors who have deep water frontages for a long lease on a low royalty, so that competition from owners of small properties will be almost useless. The boring alone will cost 2000£, probably, and the total works require, of course, a very large outlay; but if good coal be got, of which there can be scarcely a doubt, within even 2000 ft., it will leave such a profit as will probably make it the best investment going, as Sydney is the centre now of all the steam trade of the Eastern Seas, and our present export of a million and a quarter tons per annum is sure to be yearly increasing.

R. ADAMS.

COPPER MINING IN SOUTH AUSTRALIA.

SIR.—As this is one of the largest copper-producing countries in the world, some of your readers who are interested in that trade may be glad to know whether the supply from this colony is likely to be kept up or not. Burra, Wallaroo, and Moonta are names of world-wide renown, and productive as they have been in the past these old mines still continue to raise large quantities of ore. That from the two latter mines is smelted at Port Wallaroo, where the works are turning out from 120 to 140 tons of copper a week; but, owing to disagreements between the workmen and the directors, a number of miners have been dismissed, many of the exploratory points are stopped, and only the richer portions of the mines are being worked. At the Burra they have been raising from 250 to 300 tons of ore a month, but the expenses have been very heavy, owing to having to quarry away the ground, and a great deal of refuse being mixed up with the ore. The directors have now reduced the number of hands in their employ, about fifty men and one captain having been dismissed. During the last few years numerous small mines have sprung up on Yorke's Peninsula, and also in other parts of the colony, that are already raising a good deal of ore, and some of which promise to become highly remunerative after they are properly opened up, a few having already paid dividends. Amongst other valuable properties I might name the Hamley, Yelta, North Yelta, Doora, Paramatta, Devon Consols, and Wheel James on Yorke's Peninsula; and Malcolm's Barossa, Lady Alice, Bremer, and Sliding Rock in other districts as being some of the best. The ore from a few of these mines is smelted at Port Wallaroo, but the greater part goes to the English and Australian Copper Company's Works at Port Adelaide.

Taken as a whole, the returns of copper from South Australia have fallen off considerably, so much so that in order to keep his furnaces going the manager of the English and Australian Copper Company's Works has had to look out for another source from whence to get his supplies of ore. A short time ago he paid a visit to the French colony of New Caledonia, and entered into large contracts with some mining companies there. He states that the ore will assay about 30 per cent., and exists in such large quantities that he found it necessary to bind over one mine not to deliver more than 700 tons a month. The copper made from this ore will still bear the Burra brand.

The House of Assembly is at last convinced of the necessity of opening up the mining districts in the far north, and a railway from Port Augusta is to be commenced at once. The mainstay of the future wealth and prosperity of the colony lies in this direction. Such mines as Blinman, Sliding Rock, and Yudanamutana are not often to be found; and having during the last few months spent some time in these localities, I will, with your permission, in a future letter give some little account of these and other mines that are unique in their character in this rich district.

CHILLEY.

Adelaide, South Australia, Sept. 26.

THE RUSSIA COPPER COMPANY.

SIR.—It may be considered a little cruel by some parties to disturb the quiet and lethargic condition the above company seems settled down to; but as the earlier promises held out in the prospectus, and supplemented by special authority sent to Russia for the purpose of investigation gave confirmatory reports of its merits, only that here and there in the first sufficient had not been said of its enormous riches. Copper inexhaustible, woods interminable, land a whole region of; how, then, is it that the shareholders are not occasionally acquainted through the Journal, or otherwise, how all these properties are disposed of? Siberia is not further off than California, Australia, New Columbia, and we get periodical reports from these countries, and why should we not from Russia? The respectable sum of 30,000£. paid to the vendor of this to be El Dorado one would think should prompt that gentleman to furnish some report of the satisfactory progress of its working to the shareholders, or if not satisfactory what report the merits justified.

It is stated that a section of the directors are so disgusted that they threw up their seats at the board. Now, to feel disgusted at what is not straight and fair by one portion of directors towards unfair dealing is creditable in itself, but it is not enough for a body of shareholders to expect to feel disgust and desert their post; to hold their seats, and resist that which is wrong, is what the shareholders have a right to expect from those who are appointed to conduct their affairs and protect their interests.

I hope some more able hand than mine may take up the matter, and rouse this company to a little vitality. A few of something like a kindred character have lately been awoke up.

A SHAREHOLDER.

TIN MINERS, AND TIN SMELTERS.

SIR.—I am a shareholder in a young struggling tin mine in the county of Cornwall, and wish, with your kind aid, to give publicity to a little incident which throws light upon the peculiar manners and customs of the traders of the county in their relations to mining adventurers. The little mine in question has begun to scrape together a few tons of black tin monthly—much needed to assist in paying the monthly cost. It has the honour to number amongst the shareholders a well-known firm of tin smelters, and to a leading member of this firm, the purser, as in duty bound, submitted the little lot of tin at a late sampling, and asked for a quotation of price; the quotation given was somewhat less than the purser, who having been out of the county for a long period, had forgotten that it was his duty to play into the hands of the smelters at whatever loss to his employers, thought sufficient, and he was unreasonable enough to tell the great man he must bid higher. The smelter thereupon gave warm expression to a natural indignation at this gross failure on the part of the purser to recognise the vested rights of the order of the smelters, affirmed, no doubt with much truth, that his firm never took shares in mines unless they had the option of buying the tin without competition—was very wroth with the peccant purser, and then and there relinquished his shares.

Now, Sir, your readers will agree with me that we have here one of the causes of the much-lamented failure of mining enterprise in Cornwall; it is a common observation that most mines are worked for the benefit of traders and agents. I fear it is too true, and yet the mining interest submits to these crying abuses, and shed idle tears over the decline of the staple industry of the grand old county. I have, no doubt, our friend the smelter went to his parish church on the Sunday following the above little incident, and had no misgiving that during the week he had transgressed any moral law, or been guilty of a base attempt to suborn a trusted servant to play the part

of the arch betrayer, whose history he might have found in the large book in his well-furnished pew.

DETECTOR.

THE COPPER COKE OVEN.

SIR.—In the interesting description of the Coppée Coke Oven, contained in the Supplement to last week's *Mining Journal*, no explanation is given of the mode of "drawing" each oven on the completion of the coking, and probably others of your readers would, like myself, be glad of some information on this point. Is the "drawing" done by opening both ends of the oven, and applying the pressure of a ram at the front end to push the charge out at the back, or is only the back end opened, and the charge drawn out by means of a cradle; and if so, how is the cradle protected from injury in the highly-heated oven during the coking of the charge? Is the floor of the oven level, or at what inclination does it slope from front to back? Also, how long is the oven open at each time of drawing, and what precautions are taken to prevent loss of heat at that time? The cooling air channels underneath the gas flues are stated to be open at each end of the block of ovens, the air passing in at one end and out at the other. Is there not some means of obviating this loss of heat? For instance, by using this air for the supply of the ovens themselves, or for the boilers that are heated by the gases from the ovens?—Nov. 26.

A. B.

THE NORTH WALES QUARRYMEN'S STRIKE.

SIR.—I regret to find from "A Quarry Proprietor's" last letter that he forbears to comment on the "peace at any price" policy adopted at the Penrhyn Quarries, and to expose the very mischievous effect which the course adopted must have on all the slate quarries in North Wales, and, indeed, on the quarrymen themselves.

Your correspondent stated so fully and correctly the course which had been adopted up to the date of his letter which appeared in the *Journal* of Oct. 31 that it is not necessary for me to say anything further thereon, and I shall only observe that the great concessions made by Mr. Pennant Lloyd, as the principal agent of Lord Penrhyn on his lordship's behalf, did not include the following demands made by the men:—1. The dismissal of the quarry agents, and the appointment of others in their place.—2. A minimum rate of wages.—3. The unconditional receiving back and opening of the quarries to those men who had heretofore been dismissed.—4. And while he conceded that 10s. workers should be absorbed into the bargain men as soon as opportunity offered, and that those 10s. men who were then working on rock should have bargains granted to them thereon in those cases, if any, where the rock would pay to work on the bargain system—yet it was expressly confined to those cases only, and not to rock that would not pay. The whole of these demands have now been conceded to the fullest extent, and what is worse, in such a way as to cause the men to believe that Lord Penrhyn is entirely at their mercy, and that anything they may think proper to demand through their committee must be granted them.

Mr. Pennant Lloyd's concessions, some of them, were bad enough, being well calculated to lead to the very mischief which has since ensued. The letters he wrote were so worded that the men at once saw that the quarry managers were not their masters, but their servants, and obliged to do their bidding, being placed under the supervision of a committee of quarrymen, who were to be at liberty to question their judgment, and call them to account before Mr. Pennant Lloyd himself if the bargains they offered to the men were not, in the opinion of the committee, liberal enough; and, further, if the men desired to have slate bargains granted to them on certain portions of the rock the managers were to grant the same, if they could be granted as paying bargains, but not otherwise; and the men thought that they themselves had to determine this, and the managers had no option but to obey.

The result which might have been anticipated followed as of course, though certainly sooner than was expected. Mr. Pennant Lloyd had shown some firmness in dealing with the committee; he had been detained in England on this business, and left for the Continent so soon as the arrangement was come to, and the strike supposed to be ended. It was well known by the strike committee that Lord Penrhyn himself was wanting in moral courage, and had no firmness of purpose, and it was consequently determined to take advantage of Mr. Pennant Lloyd's absence and renew the strike. The agents proceeded to set the bargains, and nearly 200 were actually granted, on most of which the men began to work, but the agents having, in accordance with the arrangement come to, declined to grant bargains to a few of the 10s. workers on rock which, in their opinion, could not be worked profitably on the bargain system, the whole of the men in the quarry again struck, and it was at once seen that Lord Penrhyn was conquered, and they could have their own way.

According to Mr. Pennant Lloyd's arrangement, in case any dispute arose between the men and the agents it was to be referred to him, as the means of preventing any strike, but instead of holding to this arrangement the men determined to put on the screw and strike at once; and Lord Penrhyn gave way, and instead of requiring the men to return to their work until the new dispute had been heard and disposed of by Mr. Pennant Lloyd, consented to open the whole matter, and nominally to refer it to his agent for the sale of slates at the port, but really, as was at once seen, to yield to every demand made by the men. The force of a reference was resorted to, and, as it was confessed that the agent for the sale of slates knew nothing of the working of the quarry, the notable expedient was hit upon of joining with him a gentleman, into whose qualifications I shall not enter, as they have been freely discussed by "A Quarry Proprietor" in your last *Journal*. While the reference was proceeding Lord Penrhyn openly showed his determination to let the men have their own way, by telling the committee that he would suspend his agents, and appoint strangers to set the bargains at the next lettings. This was not sufficient for the committee, who at once insisted that the subsequent lettings should also be made by strangers, and they were not long kept in suspense.

The referee and his assistant heard the evidence of the men, and went with them to inspect the bargains, not allowing the agents to be present, and an award was forthwith published in the newspapers telling the world that the men were right on every point, and the agents wrong, although it is evident to anyone who reads the charges of the men themselves, as set out in the award, that the real and substantial objections taken by the men were the very difficult position in which they were placed to try and do their duty by their employer. It appears that they erred in doing so, and the result is that they have lost their situations, and the agent at the port, in consideration of his meritorious services as referee and so judiciously taking the hints given him, has been appointed principal agent for the quarry. Strangers have been appointed to reset the bargains, which they found to be an easy task where the 200 had been already set on terms which the men had accepted, for they had only to refer to the bargain-book and add to the poundage already agreed on as they thought proper; but where the bargains had not been previously set greater difficulty ensued, and it is said that in some cases the terms granted have been absurdly extravagant, greatly exceeding the value of any slate that can be produced, while in other cases the men cannot, resting on the bargains alone, make anything like reasonable wages, but as they have had a minimum granted them this is immaterial, they will get their wages of 30s. per week no matter how few slates may be produced. It is roughly estimated that the wages will, during the current month, be increased by one-half, and that if the present system is followed up the Penrhyn Quarries will no longer be a paying concern. It is understood, however, that the absurdly extravagant wages now granted are only intended as a bonus to be continued for a short time, and that future lettings will be gradually reduced. The attempt may be made, but will it succeed? Some people think that the present owner cannot hope so to deal with the committee, who are now supreme, and a further strike is anticipated in the spring, which may possibly end in the quarry being let on lease to some company or individuals who may be able effectually to resist the demands of the strike committee.

In the meantime, the quarry owners in the whole locality are placed in the greatest difficulty. Secret meetings are being held by

the quarrymen. Several managers who have been conspicuous for their integrity and judgment in protecting the interests of their employers have received hints from the men that unless they alter their course and make common cause with them a strike will be resorted to, and their dismissal insisted on. An increase of wages is also demanded, and when they are told that the poundage asked would exceed the value of slates made when brought to market, the answer is that Lord Penrhyn pays it, and why should not others. I could add more, but it is not necessary. It is enough to say that the course pursued by Lord Penrhyn has completely unsettled the whole of the quarrymen in the neighbourhood, and left the slate trade in the most unsatisfactory state it is possible to conceive, entailing doubt and distrust between employer and employed to an extent that a short time since was thought impossible.

Carnarvon, Nov. 24.

ANOTHER QUARRY OWNER.

A CORNISH MAN, CORNISH MINERS, AND CAPT. TEAGUE.

SIR.—In the Supplement to the Journal of the 14th inst. "A Cornishman" seems to have betrayed as little acquaintance with the intricacies of Cornish mining as that he attempted to reprove. I have no fault to find with the first part of his letter, nor shall I attempt to explain the apparently contradictory remarks of Capt. Teague at the Carn Brea meeting, still I presume it will not generally be concluded that he intended to convey the impression, or that his remarks properly understood did so, that persons competent to undertake the direction of mining operations must necessarily be otherwise ignorant; nor can it be supposed that he intended to impress upon the meeting that general knowledge, or a knowledge in particular of those branches of science which are inseparably associated with mining, is not an useful, not to say essential, qualifications in its pursuit. I read his remarks, and understood him to mean—when speaking of the necessity of practical men to direct the operations in mining—those skilled in the application of experimental knowledge, men who knew more of "things than of letters." What I take exception to particularly in "A Cornishman" is the comparison he has instituted between metallic Cornish mining and coal mining. There is some similarity it is true in externals, but intrinsically the widest difference prevails. The general arrangements and prosecution of coal mining appears to me more as a branch of civil engineering than of metallic mining engineering as generally understood. The engineering of coal mines is more of that kind which applies to railways, canals, water-works, &c., consisting of mathematical calculations, proceeding from data tangible and self-evidencing. In coal mining the end can almost be seen from the beginning; and the result, according to the provisional scale of its working, be determined with comparative practical accuracy beforehand. If metallic mining can be similarly prosecuted why, I may ask, has it not been done? It is surely not because scientific light has been excluded, for our mines have been always open to, and very frequently visited by, the servants of almost every department of science auxiliary to mining, and not one of them that I am aware of has ever condemned the principles upon which it was prosecuted. If my memory serves me correctly, Mr. W. J. Henwood—himself unquestionably one of our greatest authorities—said some time since that Mr. W. W. Smyth, the Mineral Agent of the Crown, "was, in his opinion, the greatest living authority on mining." Now, Mr. Smyth represents the extensive mining interests of the Duke of Cornwall, and is intimately acquainted with mining, not only in that and the adjoining county, but throughout the kingdom. Why has he not ventured if the operations are so blindly and stupidly prosecuted to suggest, in pursuance of his duty, that better results would be obtained by superseding practically educated miners by scholastically educated theorists?

The fact is that experiments have been made again and again in that direction, and failed. Geological attainments, however extensive and theoretically logical, do not qualify for mining, and have little utility except in a general sense; there are local peculiarities of individual sectional divisions which, no testimony, or reasoning *a priori* from geological data, can suffice to determine. It is only by practical experimentation that certain facts can be determined, and the same may be said of the other different auxiliary branches of science. A knowledge of many of which, however, added to practical mining experience, is of inestimable value. If a person applies himself to the study of a particular science he must, to become a proficient therein, find himself frequently absorbed by it; and, with a mind enamoured of a particular science, how is he to attain a thorough knowledge of practical mining, which of itself requires a long term and assiduous devotion to know its nature and requirements. Speaking of practice, of what use is scholastic knowledge without it? Practice presupposes knowledge, whether empirically or scientifically derived, and applies it to some purpose; the sources whence it was derived can make no difference as to its value, that depends on the way in which it is applied. The different schools teach knowledge, scientific and otherwise; but all the schools of Christendom are not sufficient of themselves to turn out a thoroughly qualified miner. If he gets his scientific knowledge first, the knowledge of its proper application has subsequently to be acquired.

I was particularly interested in the President's (Mr. W. Warington Smyth) address to the Royal Geological Society of Cornwall, on Friday, the 6th inst., especially that part of it which referred to M. Moissenet's—or, rather, to his corroboration of Capt. Charles Thomas's—conclusions regarding the effect on the productivity of the lodes by their curvature, and the question at once suggested itself to my mind whether such knowledge could be attained but by an exploratory operation; and, also, whether M. Moissenet could by any means have divined the facts if he had not had access to the interior of the mines. The observant miner knows as well as anyone that when a change of bearing occurs in a lode, accompanied by a falling off of its productivity, that it will probably continue so as long as that particular line of strike is maintained; but how is he to know to how a great a distance the impoverished section will extend until he has first obtained experimental proof of the fact? It is much more easy to come to conclusion from a partial knowledge of the nature of things than it is after a more extended knowledge of their different parts have been acquired. The more that is seen within the range of contemplative vision the more is usually apprehended beyond it, and the greater proportionately is the diffidence of the observer in pronouncing concerning objects until he has had an opportunity of viewing them under different aspects; and he who considers that a smattering of chemistry or a knowledge of surveying, both useful—the latter indispensable to correct mining—can qualify him to assume the direction of its manifold operations labours under an egregious error. A little knowledge we are told is a dangerous thing; I presume that means when it is—as is not unfrequently the case—attended with a large amount of presumption. But to return to Mr. Smyth's reference to Capt. Chas. Thomas's published lectures, it may be seen, by the plan of Dolcoath Mine which accompanies them, by those having a copy that exceptions may be taken to the conformability of productivity to certain lines of strike in lodes. Take the main lode, for instance, and observe the striking of the difference between the 60 and 125 fathom levels eastward towards the gossan cross-course, both shown to be in the same productive section, but differing as to the line of strike at least 20° from each other.

Now, that is a considerable difference, and one not easily accounted for, in consonance with the theory of conformability of the productivity of lodes to particular lines of longitude. The counter lode, however, as shown in the same plan, is a decidedly good illustration of that theory—the relation between the bearing of lodes and their productiveness. But a certain conformability in a particular lode cannot be a source of very valuable information in practical proceedings, inasmuch as the discovery of the fact is incident to the execution of the work, and the course of the lode at one level, as seen in the instance referred to, differing so widely from that of another whilst passing through the self-same section of productive ground. The general line of the curvature of lodes can in some instances be traced at the surface, whilst in others it cannot be. This depends upon the undulatory nature of the ground and the distinctness of its contour, and even then it not unfrequently hap-

pens that the miner encounters many occurrences in his explorations below which he had no representative, and were not indicated above, in consequence of which the most exact deductions from general facts or propositions do not afford much, if any, aid in numerous individual cases. It is one thing, it should be remembered, to draw conclusions from a critical or scientific examination of a fully-developed mine—or a number of fully-developed mines—like Dolcoath, but quite another thing to arrive at similar correct conclusions beforehand. Scientific men usually make their observations on mines after they are opened and well developed, when—I may be excused for saying—that those who opened them know quite as much about them as their scientific visitors can tell them. Science, however, affords a very valuable aid to mining. So it does to agriculture, and a number of other things, but it will never—because it never can—supersede practical skill in the working of either.

A scientific man comes along—a mineralogist for instance—and finds in a certain mine a rare mineral, valuable in his department of science, but commercially unimportant. A great deal is made of the circumstance, and a great deal credited to science accordingly, and comparisons are instituted to the disadvantage of the practical worker who might have been at the same time engaged in maturing some practical problem, which when worked out produces a greater amount of good than all similar scientific discoveries made in a lifetime. I do not ignore science, nor do I degrade it; on the contrary, I set as high a value upon it as anyone in my profession; but what I contend for is that to be productive of the greatest amount of good in mining it must be applied by those who understand its principles and multifarious details. There may be ignorant men—in the sense expressed by a Cornishman—associated with its supervision, but if even these were exchanged for schoolmen I do not think that much would be gained by the bargain, inasmuch as practical knowledge, whether limited or extensive, is subservient of some useful purpose, which mere scholastic knowledge cannot often be said to be.—*Llanwrst, Nov. 24.*

ROBT. KNAPP.

MINING ENTERPRISE—WEST WHEEL TOLGUS.

SIR.—Last week the annual report of the managers of West Tolgus was circulated among the adventurers—now the sectional plans of the mine. These must be very interesting to the adventurers, and the officials of other important mines would do well to follow this example. There seems to be a continuation of the ore ground from the 75 to the 125. The 95 is not so hard as it has been, and is letting out more water, and in all probability the rich runs of ore ground worked at the 85 will soon be met with. The bottom of the mine is the richest part of it, and it is a strong, rich, masterly lode. Notwithstanding the unfortunate mishaps which have delayed the working for several days, about 570 tons of ore will be sampled for the next account, estimated to produce 43000l. This mine has in a very short time come into prominent and deserved notice; the ore is rich, and the mine is in a good state as regards machinery, &c. The engine-shaft has been renovated, and new rods have been put in from top to bottom; this will prevent a recurrence of those unfortunate stoppages so annoying to expectant shareholders, and so vexatious to the management. Increased dividends may be expected ere long.

Cornwall, Nov. 25.

G. B. L.

ROMAN GRAVELS MINE.

SIR.—I observe in the Supplement to last week's Journal a very lame and impotent letter from Mr. Hy. Gould Sharp attributing to me motives and conduct of a personal and interested character. These I repudiate *in toto*, and would advise the writer to exercise in future that caution which he urges your readers to observe towards me, and I still further think he would show more discretion than he has yet done if, when practicals appear upon the *tapis*, he instantly retires, or otherwise he may possibly find, when too late, his philosophy disturbed when next he contemplates the effects on the uninitiated of that "immaculate circular" of his which practicals ignore.

In another letter, signed "Shareholder," appears the following sentence:—"Then the way he speaks of the new engine-shaft and its uses, I think, clearly shows that he cannot know much about it." I have not up to this date said one word about this new engine-shaft, and I dare "Shareholder" to prove it. Like "Medicus" he is untruthful, while Mr. Sharp is puerile, prurient, and abusive.

43, Bishopsgate-street, London, Nov. 24.

R. TREDINNICK.

ROMAN GRAVELS, AND CAPT. A. WATERS.

SIR.—The letter of Captain A. Waters, published in your valuable Journal of Saturday last, contains much useful and instructive information, and the shareholders ought to thank him for giving such a graphic description of the position of the shafts, the extent of ground opened out in the 65, 80, and 95 fathom levels, and the mechanical facilities at his command for discharge of ores and debris, and also for pumping of water from underground to surface.

Capt. Waters states that the engine-shaft is sunk to the 90, and that the lode underlies 5 to 7 fathoms from it in 15 fathoms sinking, so that at the 110 the cross-cut would be from 59 to 61 fathoms in length. Hence, as it takes over two years to drive 50 fathoms, it follows that it would require 2½ years to cut the lode, and from 15 to 18 months previously to sink the shaft from the 95 to the 110. Thus the returns below the 95 are cut off for four years, and the time necessary to open out on the lode, east and west, 2 fathoms monthly (each). Hence it is impolitic to carry out the operations in depth upon the same principles as have been observed ever since the shaft passed through Roman lode at the 30 fathom level.

We next approach the drive at the three levels, all of which were started to the points of intersection from cross-cuts commenced at the engine-shaft, and must necessarily be directly under each other. From Captain Waters's letter we learn that the 65 is opened out 180 fathoms south, 127 fathoms of which the present company have wrought during the past five years, or at the rate of 2 fms. 9 in. monthly. This end can be opened 25 fathoms yearly, and at present is reported to yield 4 tons of lead per fathom. North of the cross-cut this level is extended 15 fathoms, abandoned, and, of course, worthless. This level has not been uniformly productive, but three or four shoots of ore have been passed through that yielded, I am credibly informed, 2 to 4 tons per fathom, and the underlie of these shoots is decidedly northerly.

The 80 fm. level is driven 100 fathoms south of the cross-cut, and does not, from Capt. Waters's letter, appear to have been extended north. This springs probably from the 65 being poor immediately above. This has proved a good level south, and from the last report it yielded 3 tons of lead ore in the forebreast.

The 95 is, from Capt. Waters's letter, extended south 32 fathoms, and yields 2½ tons to the fathom; it is also being driven north, and yields 6 tons of ore per fathom, but it is not stated how many fathoms are opened out, and it must be remembered that neither forebreast can be pierced more than 2 fms. monthly. The lode appears to be composed chiefly of carbonate of lime and lead, while the country is clay-slate, and the price paid is from 15l. up to 17l. a fathom for driving.

At the 65 fm. level, opened out about 200 fms., there are 12 men stopping, at 5l. 10s. to 6l. per fathom. At the 80, opened out 100 fms., there are 58 men stopping, at prices ranging from 5l. 10s. to 7l. per fathom. At the 95, opened out 32 fms. south, and it is not stated how far north, there are 36 men stopping, and yet it is affirmed that the returns (230 tons last month) can be raised to 500 tons, and by experts, too. Pray who are they? Are they imported from America, or are they indigenous to Shropshire? I should like to see one of them.

The 95 is the deepest in the mine, and also the depth of the engine-shaft. Now, as to Corfield's, or the new engine-shaft, Capt. Waters states that it will be down to the 80 in six months. According to his admission it will require 18 months to sink to the 95 fm. level. Hence in about two years' time we may expect this shaft ready to receive the pitwork (after consuming six additional months in cutting plant and room for cistern), or (say) two and a half years' time; then 18 months more will be absorbed in sinking to the 110, or (say) together four years from this date, or the close of the year 1878. The whole operations must necessarily in the mean time be restricted at and above the 95 fm. level.

At the commencement of the year 1879 (if no time be lost) we

may expect to see the 110 fathom level started east and west at the rate of 2 fms. each month; and without lets and hindrances interfere during the year 1883 we may possibly see the section of lode from the 95 north to the perpendicular of the 65 south opened out on another 15 fms. in depth for 200 fms. in length on the Roman lode. This is my reading of Capt. A. Waters's letters, and I think the shareholders should thank him for having afforded me such valuable data to enable me in other language to inform them of the prospective prospects of the Roman Gravels Mine.

In conclusion, I think the Humane Society should present Capt. Waters with a testimonial for the preservation of the lives of so many men blasting powder within so restricted an area. Just fancy the 95 and 80 fathom levels, with their 48 and 64 men, say nought of boys, of whom there must be a number. There can be no complaint laid to his charge that the works are not sufficiently exhaustive.

43, Bishopsgate-street, Nov. 25.

R. TREDINNICK,
Consulting Mining Engineer.

SOUTH CONDURROW MINE.

SIR.—At the last meeting there was passed a resolution to dismiss the writer from the office of purser without notice; and, so far as I am aware, without reason. As to the justice or fairness of this step I say nothing. Believing, however, that the majority of shareholders will refuse to sanction this treatment, I decline to accept the dismissal on such conditions from this lucrative office, the total value of which is four guineas per month, out of which has to be found the salary of a clerk for daily attendance at the mine. At the meeting, on Wednesday, however, I shall, without the exercise of much self-denial, resign the situation, asking nothing more than an honourable discharge. But before turning my back it will give me pleasure to be allowed to bear testimony to the constant attention and energy, coupled with the most careful anxiety for the successful working of every point of operation, to economy in the purchase, as well as the use of necessary supplies, and to securing the best market price for the produce of this mine, which have been the daily work of my brother, Capt. W. C. Vivian, in the fulfilment of which duties he has enjoyed the constant advice of my father, Capt. Jos. Vivian, and has been seconded by the unfailing industry and assistance of the sub-agents.—Nov. 26.

JOSEPH VIVIAN, jun.

SOUTH CONDURROW MINE.

SIR.—Will you kindly inform the shareholders of South Condurrow Mine, through the columns of the *Mining Journal*, that I purpose visiting the mine on Friday, and having the same inspected by an agent of unquestionable standing, and telegraphing the result in time for your Saturday's paper.—Nov. 25.

H. WADDINGTON.

SOUTH CONDURROW.—Telegram from Mr. Waddington, Redruth, Nov. 27:—Captain Charles Thomas (Cook's Kitchen) reports King's shaft sunk to 103 fm. level, suspended. The 82 driven west 25 fms., and a cross-cut has been driven south, intersecting the great tin lode, valuable tin ground continued for 57 fms. west of cross-cut, the value of the first 30 fms. being 30l. per fathom, and the remainder 45l. per fathom; lode in end 7 ft. wide, worth 60l. per fathom. The 70 is driven west, and the cross-cut intersected the great tin lode just over the 82 cross-cut. The present end in the 71 is worth 50l. per fathom; 32 men are engaged stoping from the 82 to the 71, at an average of about 6s. 6d. per ton. This ground is being fairly worked, and has laid open 15,000l. of reserves. The 60, east of King's, driven 45 fms. from shaft, has laid open some tribute ground. Vivian's, about 70 fms. west of King's shaft, is sunk on West Bassett lode to the 60, and a cross-cut driven about 5 fms. to intersect the great tin lode. In about three months, when this shaft is holed to the 70, this will ventilate the mine, and be available to work the mine to a greater depth. Eight men and boys are employed opening up moderate tin ground at the 30, east of King's shaft. There are about 100 men working on average tribute of 11s. in 1l. The present state of the mine will warrant a return of 40 tons of tin per month when Vivian's shaft is holed to the 70. The 71 and 82 have opened up a valuable mine, No. 1 lode having formed a junction with the great tin lode about the 70, likely to continue. These ends alone have been laying open fully 30 tons of tin per month. The mine has greatly improved during six months. The mine is fairly worked, and surface works well laid out.

SOUTH CONDURROW MINING COMPANY.

SIR.—Will you allow me to furnish your readers with a copy of a slip that the committee has inserted with the notice convening the special general meeting (for Dec. 2, and not Dec. 1):—"The signing of the enclosed proxy will cancel any previous dated proxy which you may have given for the same meeting." In addition to this, a report was sent out of an inspection by a member of the committee. That to me seems the most absurd document ever issued relating to mining affairs. At Wednesday's meeting I shall, perhaps, astonish the shareholders by a complete answer to the queries raised in regard to the underground development, and, perhaps, prove that South Condurrow under new management will hardly approach the dividend state these gentlemen are sanguine enough to predict.

Great St. Helens, Nov. 26.

E. J. BARTLETT.

SOUTH CONDURROW MINE, AND ITS MANAGEMENT.

SIR.—I had hoped any remarks made in my last would not have called for a reply from either Mr. Bartlett or Mr. Waddington. "Fate has decreed it otherwise," consequently I beg a short space in reply, and hope not to trouble you again.

Mr. Bartlett seems annoyed I mentioned he only held three shares in this mine, and begs to inform you he represents a large interest notwithstanding. Mr. Bartlett seems to have overlooked that I stated this fact most plainly, even going so far as to tell you who the great majority of the shares belonged to—Messrs. Bolitho. Whether this or anything else I said in my letter has given offence I know not, but he says these gentlemen will most likely reply to my insulting remarks. Now, Mr. Editor, I assure you, and Mr. Bartlett likewise, it was the last of my thoughts to say one word that would be likely to give offence to that highly respectable firm. I hold them in too much respect, and I feel confident when they read my letter they will at once exonerate me from any such intention. Although Mr. Bartlett may not be so charitable I did say I believed that South Condurrow had long been worked for the benefit of smelters, merchants, agents, and others. I again repeat it, and Mr. Bartlett and all the share-jobbers in or out of London will never make me think otherwise.

I stated likewise I hoped with a change of committee that a different auditing of accounts would follow. Mr. Waddington remarks on my absence of knowledge, and proffers me some advice and his own experience in these matters, which I beg most respectfully to decline, however great an authority he may be in these matters. In my child-like innocence, when I require an extra stock of knowledge in a matter which I consider of the greatest importance to every mine I shall not seek it in Mr. Waddington's school.

Mr. Waddington says he once heard of a gentleman and shareholder in South Condurrow Mine who, after a thorough inspection, and after he returned home some hundred miles, in gratitude for the very substantial manner with which the machinery, tin floors, and works had been performed, sent to Captain Vivian a quantity of champagne as a slight token of his appreciation of Capt. Vivian's services. Is this the same Mr. Leach? Yes. . . . The writer says No. The paragraph is simply untrue from end to end, and I trust Mr. Waddington will in next week's Journal either say where he picked up this cock-and-bull story, or own he has been misinformed. I will then take leave of this gentleman. Allow me, however, in conclusion to state I was never on the mine but once; it unfortunately happened to be one of the most boisterous and wet days it was ever my misfortune to experience, besides which Mr. Vivian was suffering from a most violent cold; consequently, I scarcely saw anything of the mine, and what I did see looked the picture of wretchedness, "though I admit on a fine day the prospect would have appeared different;" but as to complimenting Mr. Vivian on the machinery, &c., things I never saw, is simply absurd and untrue, and as to my sending him a quantity of champagne or even a bottle

proper management. The accession of Mr. Applegarth to the partnership, which he felt perfectly certain would consolidate the company's interest in Nevada, Capt. Drake being Mr. Applegarth's partner. As had been

shown by the balance-sheet, there was a liability of 24,000. on June 30, and when he took charge the other day the first thing he did was to telegraph to Capt. Drake to know the amount of his liabilities; the reply was that they were 10,000; that 466 tons of ore had been crushed during October, producing bullion to the value of \$29,000; and, on Nov. 16, Capt. Drake further telegraphed that the mine was looking very favourable, that he could take out 50 tons of ore per day, that he had worked that month 612 tons of an average assay value of \$61, and that if he had good weather till Jan. 1 he would clear off the whole of the indebtedness. That to his (the Chairman's) mind was exceedingly satisfactory. In the five months Capt. Drake had made a net profit of 20,000, and if he has only fine weather up to Jan. 1 he will be entirely out of debt. So that with the money already subscribed he might be said to be out of debt. Allowing one month for shutting down the mill and one month for over-estimating, the present profit was at the rate of 40,000. per annum; and he was asking for 10,000. of debentures to enable the mine to be properly developed, and to start fairly from January next without any liability whatever. They wanted 2200. to pay the interest on the 22,000. of debentures; but that was a mere flea-bite in a concern like this, which had yielded such a large amount of silver, and which could not fail to produce good results under intelligent management. In the last report sent home he found that, as compared with the same period last year, the average percentage was 65 against now 88 per cent.—that was the difference between good and bad management. They now might fairly be said to be working at a profit of 40,000. per annum if Capt. Drake could only keep on doing what he has been doing the last four months. But there were many contingencies, and there had been such numberless accidents in this mine; it was, however, only reasonable to expect that Capt. Drake would continue to do as at present during the next half-year, in which case there was no doubt that at the end of that period the directors would be able to announce a substantial dividend. By 40,000. a year they could pay the whole debenture debt, and 15 per cent. on the whole of the ordinary stock of the company. He thought there was a very fair and clear prospect not only of paying the interest upon the debentures and a dividend upon the ordinary stock, but, as he had already said, in addition, the option of conversion of the debentures into shares being a very valuable one. If the shareholders had sufficient confidence to hold their shares at 5/—and he believed they were worth a great deal more—then by subscribing this extra 10/ they would have given the option directly those shares had improved of selling them at a considerable profit and holding the debentures, which would carry the option of conversion into shares. That was a very valuable option—he was perfectly willing to take a large proportion of the debentures, or to form one of a syndicate to take up the whole of them. An offer had been made to take up the whole of them, but the directors were bound to offer them in the first instance to the shareholders. The resolution he was about to propose would give the directors the option of disposing of the balance of the debentures if the shareholders did not take the whole. He thought the shareholders could but come to the conclusion that the property was in a good position, and had good prospects, and that those who subscribed for the debentures would in any case get back their interest and principal, while they had a good investment in the bargain. Reviewing all the circumstances and conditions of the mine, he thought they might reasonably anticipate keeping up the present returns and with the new year of earning a respectable dividend. He had been right before, and he hoped he should be right this time. He then moved that the report and accounts be received and adopted.—Mr. HAMMOND (a director) seconded the proposition.

Mr. T. G. TAYLOR asked if the wire-way was of any service to the company? Upon the last occasion he had a very unpleasant tussling with the Chairman, but he found that from the force of circumstances there had been a complete re-organisation of the company. Mr. Ridsdale, who occupied the chair at the outset of the company, had resumed his position; and Mr. Applegarth, whose services could not fail to be of essential service to the company, had accepted a seat as director. Perhaps some new shareholders were not aware that if the Chairman's views had in the first instance prevailed they would not continued Mr. Phillips as manager, who brought the company to a state of bankruptcy. Had it not been for Mr. Phillips, he (Mr. Taylor) was quite sure the mill would not have been burnt down, he could not shake them from his mind, and that the mill catching fire, if it had not been for Mr. Phillips they should have had the tramway constructed in a place where it could be properly worked. He mentioned these things because under the intelligent management of Capt. Drake none of these adverse circumstances were likely to recur, but that everything would be done with a view to profit. He had great pleasure in supporting the present Chairman and board.

Mr. TOWNSE asked if the debentures were to be entitled to a permanent seat on the shares? If struck him there was some clause by which the debentures could be paid off. Mr. TAYLOR noticed the clause no mention was made as to the mode by which it was intended to pay off the debentures—whether all at once or by instalments. And some of his clients had asked him to get some information about the legal expenses, which seemed to be very heavy.—Mr. CHAMBERS said that since Mr. Ridsdale's absence as chairman there had been but little information communicated to the shareholders. He hoped under the new regime more information would be given.

Mr. HAGGARD said it was the duty of each shareholder to take his proportion of the debentures. It was obvious that the moment the concern was out of debt the profits would be divided, and his advice to every shareholder would be, if he could not afford to take up his proportion of debentures, by all means to sell as many shares as would enable him to at least take some. He maintained that 86 shares and the rest put in debentures would be far more valuable than 100 shares without the debentures. He was perfectly convinced this was true financial policy. Some people said if shareholders began to realise the price would go down. He did not believe it, because the public would see the company was out of debt.

Mr. ASTON asked if he were to understand that all the debentures would be applied for if not taken up by the shareholders?—The CHAIRMAN said there had been an offer made for them, but they must be offered to the shareholders first.

Mr. ZACANT asked when the directors would be able to pay off the debentures? The CHAIRMAN, in reply to various shareholders, stated that as to the wire tram, way Capt. Drake would be asked to report upon it. It had been such a sink of money that he was fearful about spending any more upon it; but he had great confidence in Capt. Drake, who would not expend any more money upon it unless with ultimate advantage. The price of hauling had gone down very considerably since the wire tram had been erected, so that unless Capt. Drake's way was very clear for laying out any money upon it, he (the Chairman) should be very much opposed to any further expenditure. As to the debentures, he thought it would be much better they should be paid up at once; they had been made 10/ each in order to meet everyone, and the first coupon would be due on Jan. 1, which was tantamount to a discount. With regard to the legal charges, he was told they were for two years, and part of them for making the deed about the debenture issue, for stamps, and some legal charges in Nevada. They had to give sixty days' notice of the redemption of the debentures, and the option they carried amounted to a perpetual call; but as soon as it was known that the company was out of debt, the money to pay off the debentures and declare a dividend upon these shares the price of the latter would advance to over par. There was not the slightest doubt about it, because the amount necessary to pay the interest upon the debentures was equal to 10 or 12 per cent. upon the common stock.

A SHAREHOLDER said the debentures would have to be paid off at the end of two years, and asked how long they could be continued beyond that time?—The CHAIRMAN said it was quite optional on the part of the shareholders; but there was no doubt by that time the shares would be at a premium, so that the debentures would gradually extinguish themselves. As to communicating information to the shareholders, he hoped there would be no further cause under that head. Capt. Drake's partner was now a director, and had a large interest in the shares, and he could safely promise that information would be readily furnished from the other side, and that it should be quickly communicated to the shareholders. He quite agreed with the sound financial advice which Mr. Haggard had given the shareholders. No one understood figures better than Mr. Haggard, and he (the Chairman) was quite sure that if he made any lapsus Mr. Haggard would have been the first to put him in order.

The motion adopting the report and accounts was put, and carried unanimously. Mr. ROBINSON proposed that the nomination of Mr. Ridsdale, Dr. Bridgewater, Mr. Applegarth, and Mr. J. Wild as directors be confirmed. He had very great pleasure in proposing that resolution, and felt assured there would not be a dissentient voice. Mr. Wild had been a most efficient director in the Cape Copper Company, and also in the Vancouver Coal Company, both of which properties he had visited, and had been the means of bringing them out of very great difficulties into a very prosperous condition.—Mr. PORTER seconded the proposition, which was put, and carried unanimously.

Colonel RAMSAY asked when the debentures would have to be applied for? The CHAIRMAN said they would have to be applied for at once, but in order to give the country shareholders an opportunity of applying for them an option would be given to apply for them until Tuesday next, and the balance, if any, would be negotiated by the directors as they might think fit. He then proposed that the directors be authorised to dispose of the balance of any of the 14,000. of debentures (including the 4000. already taken) may remain after the closing of the subscription list at the end of the present week by tender or private contract.

Mr. ZACANT asked if they would be issued at below par?—The CHAIRMAN said if the shareholders took them they would not be issued below par; but otherwise a moderate commission would have to be paid. The resolution, however, was only a conservative one, which might never come into force at all.

Mr. T. G. TAYLOR proposed that 1000. of debentures be issued to Mr. De Pass, Mr. Hammond, and Mr. Baxter, as remuneration for the services they had rendered the company as directors during the last three years.

Mr. WHITELEY seconded the proposition.

Mr. ASTON moved an amendment that the sum of 1500. be paid out of the first profits, upon the ground that it was impolitic to vote away capital as directors' remuneration, which would be done under the terms of the resolution.

Mr. HAGGARD seconded the amendment.

Mr. HAGGARD would rather vote in favour of 2000. out of the profits than 1000. out of capital.

The amendment was carried by 12 votes against 7.

Mr. BRODERICK proposed that the remuneration to the directors for the ensuing year should be 7500.—Mr. BERGENTILL seconded the proposition.

The CHAIRMAN said that as the remuneration was not settled by the Articles of Association it was thought it would be more satisfactory if some arrangement could be made by the shareholders, and the question was simply inserted in the notice convening the meeting in order to test the opinion of shareholders as to how it was to be settled. The directors were perfectly willing to accept the decision of the shareholders whatever it might be, and, under the circumstances, probably the matter had better remain in abeyance till the next half-yearly meeting.

After some further discussion the proposition was withdrawn.

Mr. CHAMBERS moved—"That the best thanks of the shareholders be given to Capt. Drake, for they were very much indebted to that gentleman for the successful way in which he had brought their mine out of great difficulties into a successful and prosperous condition."—Mr. EDWARDS seconded the proposition.

The CHAIRMAN, in putting it to the meeting, stated that he believed in Captain Drake they possessed what was very difficult to obtain—an able, honest, and efficient manager, and he had much pleasure in supporting the proposition.

The motion was put and carried unanimously.

Mr. ASTON proposed—"That the thanks of the meeting be given to Mr. Ridsdale for having resumed his position as Chairman."—Mr. BRODERICK seconded the proposition, which was put, and carried unanimously.

The CHAIRMAN, in acknowledgment, said he would use his best abilities to promote the success of the company, and he hoped the next time they met he should, with the aid of Capt. Drake, be able to declare a dividend. He believed they possessed a mine as valuable as any in America worked by English capitalists.

The meeting then separated.

FULLER'S REEF GOLD MINING COMPANY.

An extraordinary general meeting of shareholders was held at the offices, 58, Lombard-street, on Thursday.

Mr. KIMBER said he appeared on behalf of Mr. John Rodgett, the now only remaining director, who was unable to be present on this occasion. In his unavoidable absence he moved that Mr. R. L. Jones be requested to take the chair.

Mr. W. H. TYLER seconded the motion, which was carried.

Mr. R. L. JONES then took the chair.

Mr. J. BROOKE-BOOTH (the secretary) read the notice convening the meeting, and a special resolution, forwarded by a shareholder, that a resolution would be proposed that the company should be wound-up voluntarily.

The CHAIRMAN said he felt very sorry indeed to have to occupy the position of Chairman on this occasion, but under the present emergency, Mr. Rodgett being absent, he thought it best to take the opinion of some gentlemen in London as to whether the company should be wound-up or not. They went to the Messrs. Kimber upon the matter, and as Mr. Kimber was present he would ask him to state to the shareholders the policy which it was thought best under the present circumstances to follow.

Mr. KIMBER said he had only recently been consulted in this matter at all, and the first question put to him was whether the company should be wound-up or not; and, secondly, what was the position of the shareholders with regard to the vendors. Under these circumstances he asked Mr. Jones to get what information he could with regard to the mine itself, and the contract relating to it. It now appeared to him that they were not at the present moment in a position to say what should be done, whether the contract should be cancelled, or that you should have compensation for the non-fulfilment until further information was obtained from the other side of the Atlantic. From the information they had received there was very little doubt that there was some remedy against the vendors, either to have the whole of the money returned, and probably some recompense for the outlay upon it, or if they had to keep the mine he believed compensation could be obtained for their part in the matter. He thought the vendors were quite honestly, but although the information they had obtained tended to show that the company was entitled to a compromise at least, at present this was not absolutely known. Under the present circumstances he thought it would be very unwise to take such an irrevocable step as to liquidate the company, a step which would end in the termination of the company, and as there was no immediate necessity for this to be done he thought the shareholders would only act prudently and in their own interests by abstaining from liquidating the company at present. He thought the company should be kept in a provisional state; some gentlemen should be appointed to enquire into the matter, and before any steps as liquidation or compromise with the directors could be taken the shareholders would have again to be called together. It seemed to him that the vendors themselves admitted having been deceived, and that they should take back the mine, and pay back the purchase-money, and if the vendors had acted in a bona fide manner it would, perhaps, be better that the extra amount which had been laid out on the mine should be borne by the shareholders. But if, on the other hand, the evidence showed that the vendors had intentionally deceived the company, he would recommend that proceedings should be taken against them, not only for the purchase-money of the mine, but for all the expenses consequent upon the purchase. It did not appear to him that at present there was ground for charging the vendors with fraud, and, therefore, they should consider carefully what steps should be taken. Before the company was liquidated, or any compromise determined upon, it would be well to see if the company could not be simply buried, and then there would be nothing to liquidate—it would simply cease to exist. A little difficulty would be occasioned in carrying out such a compromise by reason of a large number of shares being part of the purchase-money, but he understood that the gentlemen of the syndicate which had bought the company could not parted with their shares, but were willing to do everything that they could to cancel the shares. It was obvious to everyone that in any return of the money it would scarcely be fair that it should be distributed equally on the shares issued to the vendors in part payment of purchase-money and on those issued to the public for cash. This would be easily removable by the consent of the Messrs. Witherby. He (Mr. Kimber) thought the best course to adopt would be to accept the resignations of the four gentlemen who had retired, which left only Mr. John Rodgett as the sole director; and, secondly, that they should appoint gentlemen provisionally as a committee to act with Mr. Rodgett in considering what course should be adopted, and for managing the affairs of the company; and he thought they would see by the Articles of Association or by law that this could be done. The following gentlemen were proposed to be the directors:—Mr. Miles Rodgett, a brother of Mr. John Rodgett; Mr. J. O. Harrison, Mr. R. L. Jones, and Mr. Clement Witherby; and he would point out that although the Articles of Association require ten days' notice before these gentlemen could be elected directors it was quite competent for the shareholders to appoint them as a committee, and at the next meeting the matter could be put right. In the meantime Mr. Rodgett would be asked to act as a committee with Mr. Witherby in a rather a peculiar position as representing the syndicate which purchased the mine; if he did not mind accepting the office of director for the time being he thought his assistance would be very useful, and that in any proceedings which it might be necessary to take against the vendors or the persons of the contract he might retire. He understood that Mr. Witherby would accept office on that understanding. He thought another meeting should be called, if possible, within a month, to report what proceedings, if any, should be taken against the vendors, and as to whether it would be desirable to wind up the company or not. He thought that would accomplish all that could be done on the present occasion.

Mr. TYLER quite agreed with the views expressed by Mr. Kimber; he thought his proposition would quite meet the case.

The resignations of Major-General Hadden, Messrs. W. H. Tyler, J. Jee, and J. B. Montefiore were then taken as read, and upon the motion of the CHAIRMAN, seconded by Mr. HICKEY, were unanimously accepted.

The CHAIRMAN said the next resolution was as to the appointment as a committee of the gentlemen mentioned by Mr. Kimber.

A SHAREHOLDER said he had a very strong feeling in the matter, and he thought the company should be wound-up at once, or as quickly as possible.

Mr. MONTFIORE expressed his firm conviction that Mr. Munday had acted in a thoroughly conscientious manner throughout the whole of the proceedings. He had never seen him, but from the representations that had been made to him, and the very straightforward manner in which Mr. Munday had always given his views, he believed he was a thoroughly honest and reliable man. He had told them exactly what it would take to work the mine properly, and what would be the results. As an instance of the candour of the directors, Mr. Munday had taken in mining enterprises, Mr. Montefiore quoted the case of the Barra Barra Mine, the shares in which had once stood at 250/., and they were now reduced to 5/ per share.

The CHAIRMAN said their great and sole aim would be to stop all kinds of expense it was possible to do without, but it would be well to leave certain latitude in the hands of the directors, but no step would be taken until the opinion of the shareholders had been taken. The Chairman then read the resolution.

A SHAREHOLDER suggested that the word "forfeiture" should be substituted by "damage."

The CHAIRMAN said if the mine was really worth what it was represented to be worth they would not let it be forfeited.

Mr. KIMBER said of course shareholders could do as they liked, but he thought "forfeiture" was an unadvisable word. He thought "damage" covered what the shareholders wanted. He, of course, wished to prevent forfeiture.

Mr. EDWARDS asked whether Mr. Kimber intended to convey that the mine or the title thereto was not to be damaged?—Mr. KIMBER, in reply, said he did not wish to say anything incorrect, but he thought "loss or damage" would be quite correct.

Mr. EDWARDS agreed that the resolution would then be quite sufficient. Perhaps the Chairman would read the resolution he had proposed as now altered.

The CHAIRMAN then read the resolution as follows:—"That Messrs. Miles Rodgett, J. O. Harrison, R. L. Jones, and Clement Witherby be, and are hereby, appointed a committee to act with Mr. John Rodgett, the remaining director, and considering and deciding upon the course to be adopted, and meanwhile to manage the affairs of the company, and to take such proceedings or enter into such negotiations as they may think fit, and that for these purposes they are hereby invested with all the powers conferred upon the directors by the Articles of Association, or by law or otherwise. And that they do not incur any further expense in the mine until the shareholders are again convened, and otherwise resolve, except such as the committee considered necessary to prevent loss or damage." He moved this resolution.—Mr. BROOKE-BOOTH seconded the resolution, which was put and carried without dissent.

The CHAIRMAN said the next resolution was that so far as the meeting had power to appoint them as directors Messrs. Rodgett, Jones, Harrison and Witherby should be appointed the directors of the company.

A question was raised upon this point by Mr. W. H. TYLER, whereupon Mr. KIMBER explained that the meeting was called to fill up vacancies on the board. The ordinary course was for the candidates to give notice of their intention to offer themselves for election; but he considered that the shareholders had power to appoint gentlemen without the usual notice if two of the gentlemen to be elected declined to serve unless the other gentlemen were also elected. Under such circumstances he contended the shareholders had the power to dispense with the ten days' notice which was properly called.

Mr. SMYTH (the solicitor of the company) remarked that Mr. Lindley advised otherwise.

Mr. MONTFIORE said he had considerable funds in his own name, but he was willing to transfer them to a properly constituted committee, but unless direction was legally carried out it could not be done. He would put no impediment in the way if the matter could be legally arranged.

Mr. KIMBER had the authority from Lord Justice James to say that the shareholders had got an inherent right to do things which were absolutely necessary.

A SHAREHOLDER: But I do not see the necessity.

Mr. KIMBER would put a case. If a body of gentlemen were asked to be directors of a company and they declined to do so, would the business would have to be left in chaos because of that? Certainly not. But even if there was any objection, and he was in the wrong, he would ask the shareholders what then? No harm would have been done, but, on the contrary, great good would have been done, and they would be able to give a moral authority to the gentlemen who had been nominated to fill the vacancies. There was this reason why it should be done, because if the two gentlemen proposed were not appointed it would leave only three, and as Mr. Rodgett was living away from London it would frequently be very difficult to obtain a quorum of the board. Mr. Harrison was in an entirely independent position, but Mr. Clement Witherby was not, and it would be extremely unadvisable for the shareholders, and he would advise Mr. Witherby so, to leave the management of the company in such a position that all the questions should be decided upon by two gentlemen. If one voted against the other there would be a dead lock, or if Mr. Clement Witherby was unable to persuade Mr. Harrison on any topic the business would not be properly administered. He was quite sure that Mr. Witherby would do nothing wrong, but when three or four interests had to be served it was a difficult matter to know exactly how to deal.

Mr. F. WITHERBY remarked that if Mr. Clement Witherby took office he would only do so on the understanding that if there was the slightest objection made by the shareholders, or anyone else, he would retire at once. He would simply act as a stopgap because no one else had been mentioned.

Mr. EDWARDS suggested that two gentlemen should be elected to fill the vacancies. His own opinion was that unless this was done the appointment would be illegal. If two gentlemen were appointed with Mr. Rodgett the other gentlemen could form a committee.

Mr. KIMBER said that as regarded Messrs. Miles Rodgett and Jones, he had said very distinctly that whether it was technically valid or not they would have the authority of the gentlemen present. [A SHAREHOLDER: You may take that for granted.] But it would be necessary to have the resolution endorsed by the shareholders present. He wished it to be distinctly understood that there was not the slightest objection to Mr. Witherby.

The CHAIRMAN: Oh, no; certainly not.

Mr. TYLER suggested that the different gentlemen should be elected separately. After a short discussion this course was decided upon as the proper one to pursue.

The CHAIRMAN then proposed "That Mr. J. O. Harrison be, and is hereby appointed a director of the company in lieu of Mr. Montefiore."

Mr. BROOKE-BOOTH seconded the proposition, which was carried.

The CHAIRMAN said the next resolution he had to propose was "That Mr. Clement Witherby be, and is hereby appointed a director in lieu of Major-General Hadden."—Mr. GOODALL seconded the resolution, which was carried.

Mr. J. R. JONES proposed, and Mr. HICKEY seconded, the following resolution, which was adopted:—"That so far as this meeting has powers to appoint them as directors, Messrs. Miles Rodgett and R. L. Jones are hereby respectively appointed directors in the room of Mr. Jee and Mr. W. H. Tyler respectively, and the other directors are authorised and requested to take such steps, if any, as may be necessary to make the seats of these two gentlemen valid."

The CHAIRMAN then said there was another resolution, of which some words at the end had been struck out. He proposed "That such committee do cause another meeting of the shareholders to be convened, if possible, one month from this date, for the purpose of considering whether any or what proceedings should be commenced or founded against, or compromise accepted from the vendors, and whether it is advisable that the company should be wound-up."

Mr. KIMBER said the motion which was carried, having explained that it would not be necessary to confirm these resolutions, the only resolutions requiring confirmatory meetings were those for altering Articles of Association, raising additional capital, or winding up.

Mr. KIMBER said Mr. Joseph had entered the room since he had addressed the shareholders. Perhaps Mr. Joseph would state his views as to what should be done as to the mine. Had Mr. Joseph anything to say about the vendors?

Mr. JOSEPH replied that he did not know what information the shareholders required. Mr. Kimber probably knew as much about the vendors as himself.

Mr. KIMBER said the Fuller's Reef Mine did not appear to have come up to the expectations either of the vendors or the shareholders of this company. And under these circumstances he would like to know what the vendors were of opinion could be equitably done.

Mr. JOSEPH asked whom Mr. Kimber referred to in speaking of the vendors? Mr. KIMBER replied that he referred to the Denison Gold Mining Company.

Mr. JOSEPH said the company did not sell the property to the Fuller's Reef Mining Company. They sold it by a written contract to three gentlemen—Sir Seymour Blane, Mr. Witherby, and Mr. Hickey.

The CHAIRMAN remarked that these three gentlemen represented the Fuller's Reef Mining Company.

Mr. KIMBER said it was the same thing. As he understood it, these three gentlemen were of opinion with the shareholders that some steps should be taken.

Mr. JOSEPH said he declined to be treated there as having anything to do with the vendors of the property to the Fuller's Reef Mining Company, and he wished that to be distinctly and clearly understood. He would be most happy as a shareholder of the Fuller's Reef Company to give any information he could with respect to the property which he was a shareholder, but he would not be enticed or staggered with the promise of a vendor of a property which had cost the enormous sum of something like 150,000. to the vendors.

Mr. KIMBER replied that he had not put a single question; he merely wished to ask Mr. Joseph's opinion as to how to get over the disagreeable business. He had not attached any stigma to Mr. Joseph in mentioning the vendors; he had not intended anything improper.

Mr. EDWARDS said that on a former occasion Mr. Joseph favoured them with some remarks in vindication of Mr. Montefiore, who was then abroad.

Mr. JOSEPH said he had not said anything in vindication of Mr. Montefiore. And, with respect to the property, he thought the best thing was to read Mr. Munday's report, and also that made by Mr. Waters, who inspected the property before it was purchased for the Denison Gold Mining Company. This company consisted of about 50 or 60 shareholders, and he did not think that company would have anything to say to the Fuller's Reef Company at all. They were also shareholders in this company, and were rowing in the same boat.

Mr. KIMBER remarked that was by reason of the shares for the purchase-money. Mr. JOSEPH said the gentlemen agreed to sell for 20,000. in cash, and a certain number of shares. There was four fifths of the purchase money in cash, and one fifth in shares. It was afterwards reduced, he believed, and they only had 15,000. in cash.

The CHAIRMAN said it would be found that 20,000. was paid in cash, but Mr. Joseph said he thought that was not correct.

Mr. KIMBER asked Mr. Joseph if he thought the Denison Gold Mining Company would buy up the cash shares, and take the concern back again, and then this company could be wound up. Or they might let the Fuller's Reef Company be their company.

Mr. JOSEPH thought that proposition would certainly not be accepted to, for they did not recognise having anything to do with the Fuller's Reef Company.

Mr. KIMBER: But the transfer was made direct.

Mr. JOSEPH said that was done as a matter of accommodation for the Fuller's Reef Company, as there was evidence to show. They were requested, instead of transferring it to Mr. Hickey and his friends, it should be transferred to the Fuller's Reef Gold Mining Company. The solicitors of the Denison Company would not accede to the request until they obtained the written contract from Mr. Hickey, and now was sought to make that a proof that the transaction was between the Denison Company and the Fuller's Reef Company, which was not correct.

The CHAIRMAN remarked that the vendors knew the property was to be taken by the Fuller's Reef Company.

Mr. JOSEPH said they positively did not know that. There was another fact. The Denison Gold Mining Company would make no representation whatever of the property, but asked the purchasers to go to the property and see it for themselves, and for this reason Mr. Waters was sent out, and reported to his principals, who bought the property.

Mr. EDWARDS asked who were the proprietors of the Denison Gold Mining Company? Mr. JOSEPH said there were a large number of shareholders. There was a commission out there now, and they would have the information shortly. A portion of the money was paid over to the Denison Gold Mining Company by the Fuller's Reef Company. Mr. Hickey attached a certain portion of this money on a plea of commission for selling the mine. In connection with that matter a commission had now gone out to Australia to take evidence.

Mr. EDWARDS: Who is moving in this suit?

Mr. JOSEPH: I do not say who.

Mr. HICKEY: Mr. Montefiore and Mr. Joseph. Mr. Joseph distinctly denied the veracity of that statement. As a matter of fact the whole of the money paid to the Denison Gold Mining Company would not recoup it for the amount expended on the mine prior to the sale by the Denison Gold Mining Company.

Mr. KIMBER remarked that that was quite beside the question; it was not a question of the Denison Gold Mining Company, but one of individuals.

Mr. JOSEPH thought it was highly probable that it was a very rich property; certainly up to the time that he had been an active shareholder in the Denison Company, he had looked at the property himself, and had had a very high opinion of it. From the information which he had obtained since he had been in England he believed that the stone had come out perfectly worthless, and that the gold appeared to have run out. This was nothing new, for he was interested in 50 mines, and perhaps 30 or 40 out of the 50 during the last 12 or 18 months had been in exactly the same position, and some of them had been abandoned. He thought the best course was to take the opinion and advice of men like Mr. Munday, who understood the matters thoroughly.

After a few other remarks Mr. COLLETT said he had known the Fuller's Reef from the commencement, and it was a very peculiar reef. The first shaft gave 2 ozs. to the ton. At another time it had given 2 1/2 ozs. to the ton, and even 3 ozs.

Mr. KIMBER asked if Mr. Joseph thought it would be possible to find a purchaser.—Mr. JOSEPH, in reply, said he thought Messrs. Gilchrist and Weston, the company's legal managers out there, would be able better to give this information than he could. They were on the spot, and he had not been in Australia for nine or ten months, and things fluctuated there very much, especially in mining matters. As present the whole population was anything to do with mines.

With respect to a new property, Mr. TYLER (the late chairman of the company) said a letter had been received, stating that if this company would not take up this new mine the gentlemen in Australia would do so themselves. It had cost about 1000. to test it.

Mr. MONTFIORE then proposed a vote of thanks to the Chairman, which was carried, and the CHAIRMAN having briefly responded, the proceedings terminated.

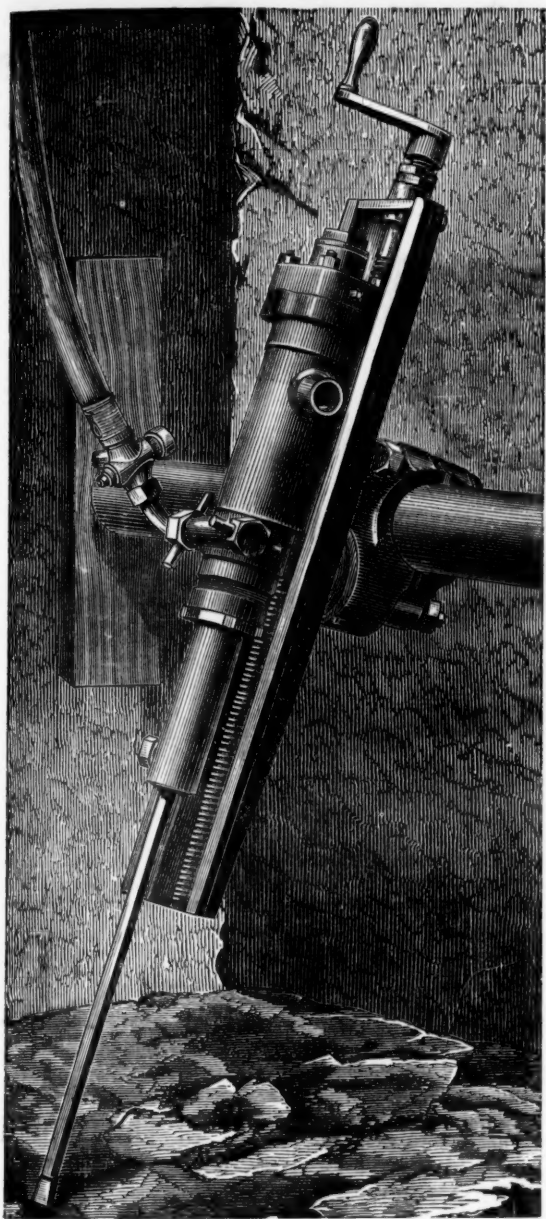
BATTLE MOUNTAIN MINING COMPANY.

The fifth ordinary general meeting of the shareholders in this company was held at the Law Association Rooms, Cook-street, Liverpool, on Monday.—Mr. JAMES HALLOWS (Chairman of the board of directors) presiding.

There were also present Messrs. A. Castellain, P. Campbell, Paton, Brown, Drover, Whitney, Chamberlain, James, Hayes, Houghton, Pryce, Henson, Nancarrow, &c.

The report of the directors, which was accompanied with a statement of accounts for the year ending June 30, showed a large falling-off in the produce of the mine, but stated that recent accounts were of a more encouraging character. The shaft had been sunk 250 ft., and a level would be driven as soon as labour could be obtained, and the directors look for very satisfactory results, as Cook's winze (one of the new workings), which was being sunk below the 185 ft. level, showed a lode of

PERCUSSIVE ROCK-BORING MACHINERY, AND THE DARLINGTON BORER.



For many years past bold and persistent attempts have been made by numerous inventors to establish the use of percussive Rock-Boring Machinery in Mines and Tunnel Work. Besides many continental engineers, a host of English engineers have given attention to the subject, amongst whom may be honourably noticed Trevithick, in 1813; Bartlett, between 1854 and 1856; Crease and Low, both inventors of numerous machines, some of which have been practically worked; Doering, Jordan, Darlington, Westmacott (connected with Sir Wm. Armstrong), Brydon and Davis, Edwards, Warsop, and others. The object of each inventor has generally been to produce a percussive borer, with an automatic, valvular, turning, and forwarding action. A few, however, have been content with an automatic movement and turning of the piston, whilst Westmacott and Warsop have only sought to secure an automatic movement of the piston, preferring to beat the head of the borer, and to turn the latter by a distinct contrivance.

The first really successful borer and boring operations are associated with the engineer Sommeiller and the Mont Cenis Tunnel, where the borer piston was free to act without the impediment of valvular and turning gear; in fact, these two latter functions of the machine were performed by a small independent engine, an idea just at this time revived and patented by an English inventor.

The German engineers Schumann, Schwarzkopf, and Sachs were, perhaps, the next to contrive and work borers, with more or less success. In Schumann's machine, employed at Altenberg, the movement of the valves, as well as the turning of the piston, were performed by hand. The inventor applied expansion valves worked by eccentrics. Bergström, in Sweden, also drove various levels by means of his machine, in which the movements were only partially automatic. In 1865 Sachs's machine was used at Altenberg in driving the 90 metre level cross cut from the Perrier shaft. The machine was self-contained, and performed the boring, turning, and forwarding movements automatically. About 1870 Osterkamp, of Eschweiler, contrived a simple machine, in which the valvular movement was effected by means of compressed air, and the forwarding movement by hand.

In France, Cavé in 1851 patented a machine in which the borer was fixed to the piston-rod. Compressed air was admitted to the back of the piston, the valve being moved by hand.

In the Colony of Victoria, Ford in 1863 contrived a rock-borer, and did some work with it at Ballarat. The various movements for boring, turning, and advancing the tool were automatically performed.

America, as may be supposed, furnishes the names of several inventors. In this country is known the Burleigh, McKean, Dunn, and Ingersol "drill," each of which performs its work automatically, but, at the same time, each is characterised by different varieties of striking gear.

In Belgium a successful borer has been devised by Messrs. Dubois and Francois, the latter gentleman having been an assistant engineer in the making of the Mont Cenis Tunnel. The valve and turning movements are automatic, but the machine is advanced by hand as the hole is deepened.

The diamond drill is scarcely within the scope of the present notice. The "Crown" is the invention of M. Leschot, and was patented in 1862. About 1867 Mr. Charles Appleby, with the aid of his staff and Major Beaumont, contrived a successful apparatus for driving the diamond drill, first set to work at the Crozier Slate Works, in North Wales. It may be supposed that however excellent and valuable the diamond drill may be for prospecting purposes, yet that it is deemed scarcely applicable to the rough and ready demands of tunnelling and mining, since lately the managing director of the company, Major Beaumont, has patented a percussive drill.

The failure of most borers are traceable to one chief cause—the inventor tries to accomplish too much, in a wrong direction; he makes a percussive machine which must have a variable stroke, and subjects some of his automatic gear to the percussive action of the piston; the result is frequent breakages, and necessity for constant and vexatious repairs. It is not intended to enter into a comparative criticism of the machines now before the public, but it is right to state that assertions are continually made which some of the machines will not practically justify. The consumption of compressed air per stroke to effect a given amount of work is of considerable moment. Gear, however strong it may be, subject in any way to

the blow of the piston, must sooner or later be broken, or rendered useless, and no self-contained machine can strike the blow and open the exhaust valve after such blow is struck. Dead pressure of steam will not in itself produce a greater cutting effect than a dead pressure of water. A piston that will not move without a certain velocity and weight will not drive the borer effectively.

In this country the question is often put why is not rock-boring machinery successful? Without following the question with a distinct reply, it is intimated that the driving power cannot be properly transferred, that the protracted attempts made years ago at Tincroft and Dolcoath were unsuccessful, and that the new borers recently employed have not given results which would justify any reasonable hopes of success. To discuss such observations would be idle in presence of the fact that nearly 500 boring machines have been made by one continental firm, that the rate of driving levels in the coal sandstones and shales in Belgium and Germany is about 1 fm. in 24 hours, and that at St. Gothard the advance in two ends of the tunnel, where the rock is granite, is 3 fms. per day in each, and that if the same means be applied in this country the same general results must and will inevitably follow. Here it may be well to enquire the meaning that should be attached to the word success. It does not altogether lie in the borer; this ought and must be a reliable as well as an efficient tool. Neither is it to be found in placing the borer in the hands of men who, perhaps, have never started an ordinary steam-engine, and requesting them to double the rate of progress with a tool of whose construction they are entirely, and wish to be profoundly, ignorant. Neither is it found in placing a single borer to do an inordinately large quantity of work in a given time, in connection, perhaps, with a small and badly contrived compressor, but success consists in performing such an amount of work as will satisfy the employers of rock-boring machinery, and must be associated with ample mechanical means, organisation of the work itself, and a class of men in connection with the machines who not only understand how to use them, but who will, with the assistance of power and powder, treble or quadruple the rate of progress which can possibly be made by hand labour alone.

One of the boring machines before the public, invented by Mr. Darlington, is selected for present description. In a paper read before the Institute of Mechanical Engineers, in May last, by Mr. Jordan, this gentleman states that "very highly finished and elaborately constructed machines have been used, and are capable of doing good work so long as all their delicate adjustments remain intact, but this is a matter of great difficulty under the inevitable conditions of mining. Sand and water are not good lubricants for fine machinery, but they cannot be avoided, and therefore fine gearing is inadmissible. All striking and cam motions are very objectionable, because under the rapid action of these engines they tend to destruction. All large clearance spaces in the cylinder are decidedly objectionable, because they waste the somewhat expensive power which there is a necessity for using. All clamps and fixings which require the use of a hammer are objectionable, because a hammer in rough hands is a destructive instrument. All spiral fittings in the shanks of the tools, such as slots and collars, are objectionable, because they are expensive. Slide valves, and the means of moving them, have been found fruitful source of derangement, delay, and cost.

The Darlington rock-drill is without a valve, or any of the special arrangements above enumerated. Hitherto the machines used in our mines have not been perfect, but they have been gradually approaching perfection, by their complications being lopped off bit by bit, until he found the true rock-drilling machinery in the simplest elements of all its predecessors. All have cylinders and piston-rods, in combination with an infinite variety of valves, and gearing for actuating them, and many intricate parts for advancing the borer, in proportion to the hardness of the rock. Some considerable experience with these arrangements has shown that it would be a great advantage to avoid all external gearing, and reduce the number of parts in the machines as much as possible. These difficulties are got over in the shortest way by omitting these parts altogether, still retaining a machine which will make from 100 to 1000 blows per minute, and sink holes in hard granite at the rate of 6 in. per minute, under a pressure of from 40 to 50 lbs. per inch. Only two parts are essential to produce the percussive action of the engine, and it is impossible to obtain power from elastic fluids with less than one moving and one fixed part. The cylinder and cover may be regarded as the fixed part, the piston and rod (which are forged solid) as the moving part, and there are no other parts requisite to

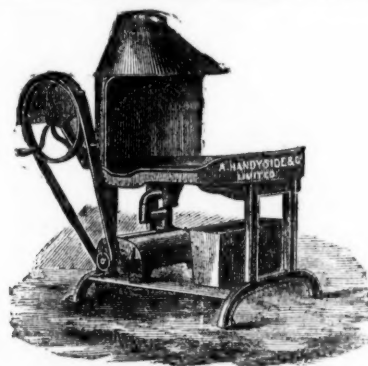
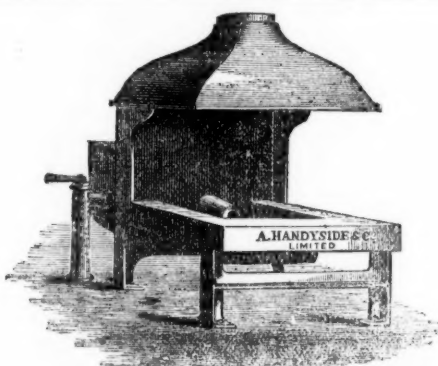
produce the reciprocating action of the machine." The contrivance for rotating the drill patented jointly by Jordan and Darlington many years ago, and since adopted by other makers, is inside the cylinder, and is, therefore, protected from grit and dirt. It consists of a spiral or rifled bar, fitted at its head with a ratchet wheel, recessed into the cover of the cylinder, with a patent escapement pawl to the wheel, allowing the bar to turn freely in one direction only. The piston and gland are without packing, whilst the borer is firmly retained in the head of the piston-rod, by means of a clamp, contrived especially for that purpose. The machine for shaft sinking, shown in Fig. 1, is fixed on a stretcher bar. When, however, the shaft is large two machines are placed on the same bar; whilst for the driving of levels the machine may be fixed on a stretcher bar or on a carriage. For quarry work, when the bedding is tolerably flat, the machine is mounted on a tripod stand, as illustrated in Fig. 2. Mr. Darlington does not in every case employ the stretcher-bar, but has designed carriages, mounting two or three machines, as well as frames for sinking shafts, in which two borers may be swung from horizontal or pendulating arms. The view he takes is to do the work quickly, and to have power enough to drive even three or four borers in a shaft or level at one and the same time. He also advocates the boring of deep holes at one general operation, the firing of the centre holes to form a sump, and to facilitate the blasting of the side holes, also to explode the side holes electrically, so as to rend the rock to the extent determined by the depth of the holes themselves; in fact, he insists upon forcing the work mechanically, and not to limit the use of boring machines to the mere conditions of hand labour. He also states that there are rocks, such as soft shales, in which boring machines are of no practical value; that the machines are most effective on hard rock, and that the power of the borer must always be in proportion to the hardness of the rock, and size and depth of the holes intended to be bored. Moreover, for the purpose of economising time and power, the holes should not be bored larger than is absolutely necessary. He is also of opinion that a couple of small holes set tolerably close, and fired together, will do more work than a very large hole (say, 3 in. in diameter), and asserts that the placing of a cartridge of dynamite 1 in. in diameter into a hole 2 in. in diameter can only result in lessening the instant force of the explosive, and a loss of explosive effect. The dimensions of the boring machines already made are given in the following table:—

Sizes.	No. 1.	No. 2.	No. 3.
Weight with carrier frame.....	190 lbs.	148 lbs.	180 lbs.
Length of cylinder over all.....	16 in.	16 in.	19 in.
Length of machine and frame over all.....	36 in.	36 in.	36 in.
Length of feed without changing bore.....	24 in.	24 in.	24 in.
Size of machine in cross section.....	6 x 6	8 x 6	9 x 7

In the Darlington borer the piston will start at any part of the stroke, the length of the stroke may be rendered long or short, and the force of the blow thereby varied to suit the character of the stone to be bored. The air is worked expansively, a matter of great moment when power is costly, whilst the machine is of such small dimensions as to enable it to be employed close to the roof, side, or bottom of a level. At the meeting of Mechanical Engineers referred to a No. 2 borer sunk holes in hard, tough granite at the rate of 7½ in. per minute. The novelty of the invention itself is attested by the fact that a Prussian patent has been granted to Mr. Darlington, and for no other borer now before the public, whilst its utility and simplicity have been recognised in an official report recently made by Herr Berggrath Voss to the Minister of Commerce at Berlin.

At the last meeting of the Royal Cornwall Polytechnic a first silver medal was awarded to the machine. At present and for some time to come boring machines will probably only be largely effective in driving long levels, cross-cuts, and in sinking shafts. For vein works, when the ground is vughy, and for making limited exploratory trials, the results from boring machines are likely to be disappointing to the mine adventurer. But what should be insisted upon with British miners is the fact that on the Continent boring machines are worked so as to quicken the rate of advance in levels and shafts three and four times greater than is practicable by the ordinary method of working, and that similar results can and should be realised in this country.

GAS.—Sir F. C. KNOWLES, Bart., of Lovell's Hill, Berks, has patented an invention which consists, firstly, in obtaining pure carbonic oxide by calcining limestone or chalk, and then converting into carbonic oxide the carbonic acid gas evolved; and, secondly, in mixing black oxide of manganese with charcoal of wood or of peat, coke, or anthracite coal.



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FOREIGN MINING AND METALLURGY.

The intelligence to hand this week from the principal Belgian metallurgical centres is somewhat meagre. Business remains quiet, the works have a little employment assured to them for the winter, and their proprietors are hoping for a serious revival in affairs in the spring. Plates and scrap-iron appear to be articles which are in most request at present, and the prices of which are supported with the most firmness. No. 1 merchants' iron remains quoted at 84. 4s. per ton, most of the Luxembourg blast-furnaces having already disposed of their production of pig for 1875. Competition is no longer to be much apprehended from that quarter, and a sensible variation in this article does not accordingly appear probable. The lighting is announced of the Maizières-les-Metz blast-furnaces, near the Belgian frontier. These blast-furnaces are rather more than 60 feet in height, and they can produce from 60 to 70 tons every 24 hours. They are furnished with Cooper-Siemens apparatus, and they are equipped with all the most modern improvements. The minerals treated yield 32 per cent. of iron, while they do not cost more than 3s. 9d. per ton. German coke is also delivered at 17. 3s. 4d. per ton, with long-termed contracts, and altogether it would seem that the conditions of production are calculated to induce the proprietors of Belgian works to indulge in serious reflections. A comparison of the cost of producing pig at present in England, in the Grand Duchy of Luxembourg, in Alsace and Lorraine, in France, in Westphalia, and in Belgium would be a matter of considerable interest just now, but it is difficult to procure sufficiently precise information upon the subject.

The aspect of the Paris copper market has been satisfactory to holders, quotations being maintained with firmness. Chilean in bars has made 94½; ditto ordinary descriptions, 92½; ditto in ingots, 97½. 4s. per ton. English tough cake, 97½; and pure Corocoro minerals, 92½ per ton. There has been a sensible advance in old metals in consequence of the improvement which has been established in new metal. Quotations for copper have also been hardening at Havre. In consequence of the reduction of stocks in Germany there has been very little business passing; nevertheless, prices have shown firmness. With regard to tin, it may be observed that Banca, delivered at Havre or Paris, has made 106½; Straits, ditto, 100½; and English, delivered at Havre or Rouen, 100½ per ton. At Marseilles tin has been well supported, but without any very active demand. The German tin markets have been pretty well supported at former rates. There has been little disposable lead upon the Paris market, and prices have been pretty well supported. French lead, delivered at Paris, has brought 23½. 16s.; Spanish, delivered at Havre, 23½. 4s.; and Belgian and German, delivered at Paris, 23½. 1s. per ton. Lead has been quiet upon the Marseilles market. The German lead markets have been well supported. Zinc has been rather scarce at Paris, and prices have ruled firm in consequence. Silesian zinc, delivered at Havre, has been quoted at 25½. per ton; other good marks, delivered at Havre, 25½. per ton; and ditto at Paris, 25½. 4s. per ton. At Marseilles rolled Vieille Montagne zinc is quoted at 32½, and other marks at 31½. 4s. per ton.

The French iron trade presents an indecisive appearance, the tone of the trade being sometimes good and sometimes bad. The aspect of affairs varies according to the various districts of France, and even from one establishment to another. In one locality the works with hydraulic motors have been much troubled by drought, while in the same district congratulations are exchanged on the satisfactory current of affairs, and on a tolerably regular amount of work. Prices have not sensibly varied. It is doubted whether the dividends of the French metallurgical companies will be so favourable for 1874 as for 1873, when previously concluded cheap contracts for materials exerted a very beneficial influence. The French Society of Civil Engineers has been occupied with the question of narrow-gauge railways; allusion was also made on the occasion to tramways considered as cheap railways.

The general aspect of the Belgian coal trade has not varied materially during the last few days. A little more movement in affairs has been reported in the Charleroi basin; while, on the other hand, there has been rather less activity in the Mons basin, especially as regards domestic qualities. Prices are generally unchanged. A reward, amounting altogether to 4000l., has been offered to the direction of the colliery the most free from explosions of fire-damp during the period from 1873 to 1883 inclusive. The offer has, however, not been altogether well received, as the directors of Belgian collieries are, without any exception, too conscientious to require the stimulus of any pecuniary reward to induce them to do their duty. An explosion of fire-damp is always accidental and sudden, and generally occurs in spite of the utmost efforts at prevention. The North of Châtelineau Colliery Company has been formed to work to a certain specified depth all the beds of coal comprised in a portion of the concession of the Gouffre Colliery Company; it has acquired this right, over an area of about 500 acres, for a sum of 24,000l. A gallery traverses the whole concession from north to south; this gallery has indicated the existence of 17 workable beds, which are cut and re-cut 51 times by it. The quantity of coal in the concession is estimated at 1,100,000 tons. The Council of Administration has taken measures for securing a daily extraction of 350 tons.

The Paris coal market has been dull and heavy, and a comparatively limited amount of business has been passing. The requirements of consumers for the season appear to be fully assured, and this circumstance is a strong reason in favour of the maintenance of prices at about the same level. The intelligence received from the Pas de Calais is as meagre as possible; prices are as well maintained as the securities of the various coal mining companies; the simile is not applicable to Ferfay shares, which have fallen in consequence of a rather stormy general meeting. We have not yet received a full report of this meeting, but grave dissensions appear to have arisen between the shareholders and the Council of Administration. The shares, which stood at 124½ to 128½ a few days since are now at 100½. There are complaints of bad management, violation of statutes, &c. Cases of this kind are rare in the Pas de Calais basin, where the mines are generally exceptionally well directed. The production of the Refy, Turques, and Hardinghen basin is stated to be increasing; at the commencement of this month it amounted to 350 tons per day. The intelligence received from the basin of the Loire continues unfavourable; the business passing has been done at a decline, and prices are purely nominal for most qualities. Thanks to some new concessions granted to the Paris, Lyons, and Mediterranean Railway Company, certain coal bearings in the South of France will now have improved means of transport. The Bessèges, Alais, and Grande Combe basins will also be better united in future.

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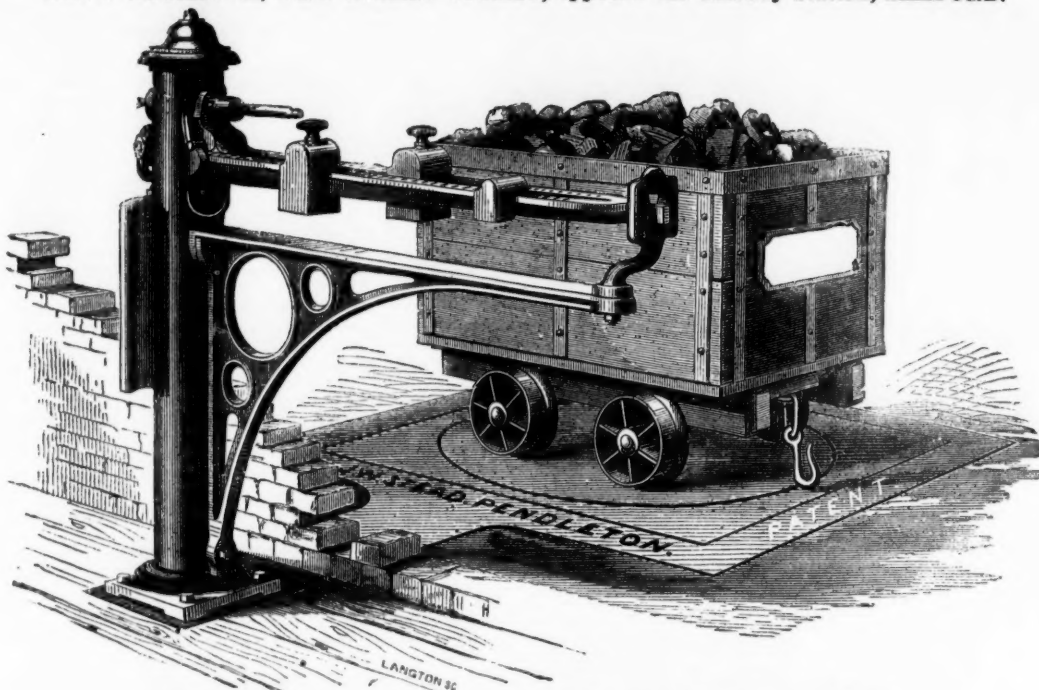
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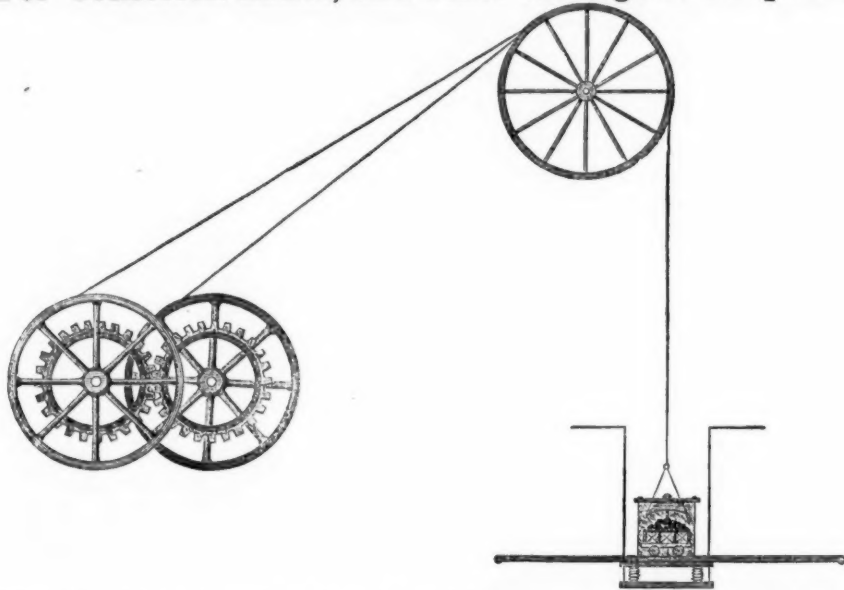
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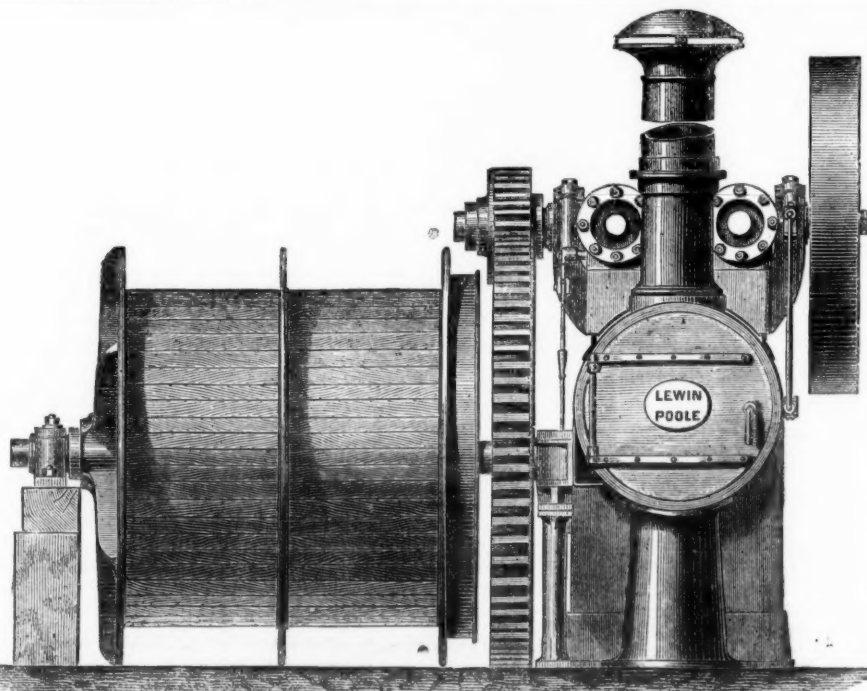
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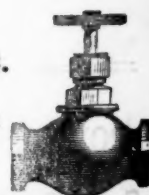
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